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ROCKWELL INTERNATIONAL ANAHEIM CA ELECTRONIC DEVICES DIV F/G 9/3  
HYBRID TECHNOLOGY COST REDUCTION IMPROVEMENT STUDY PROGRAM. VOLU--ETC(U)  
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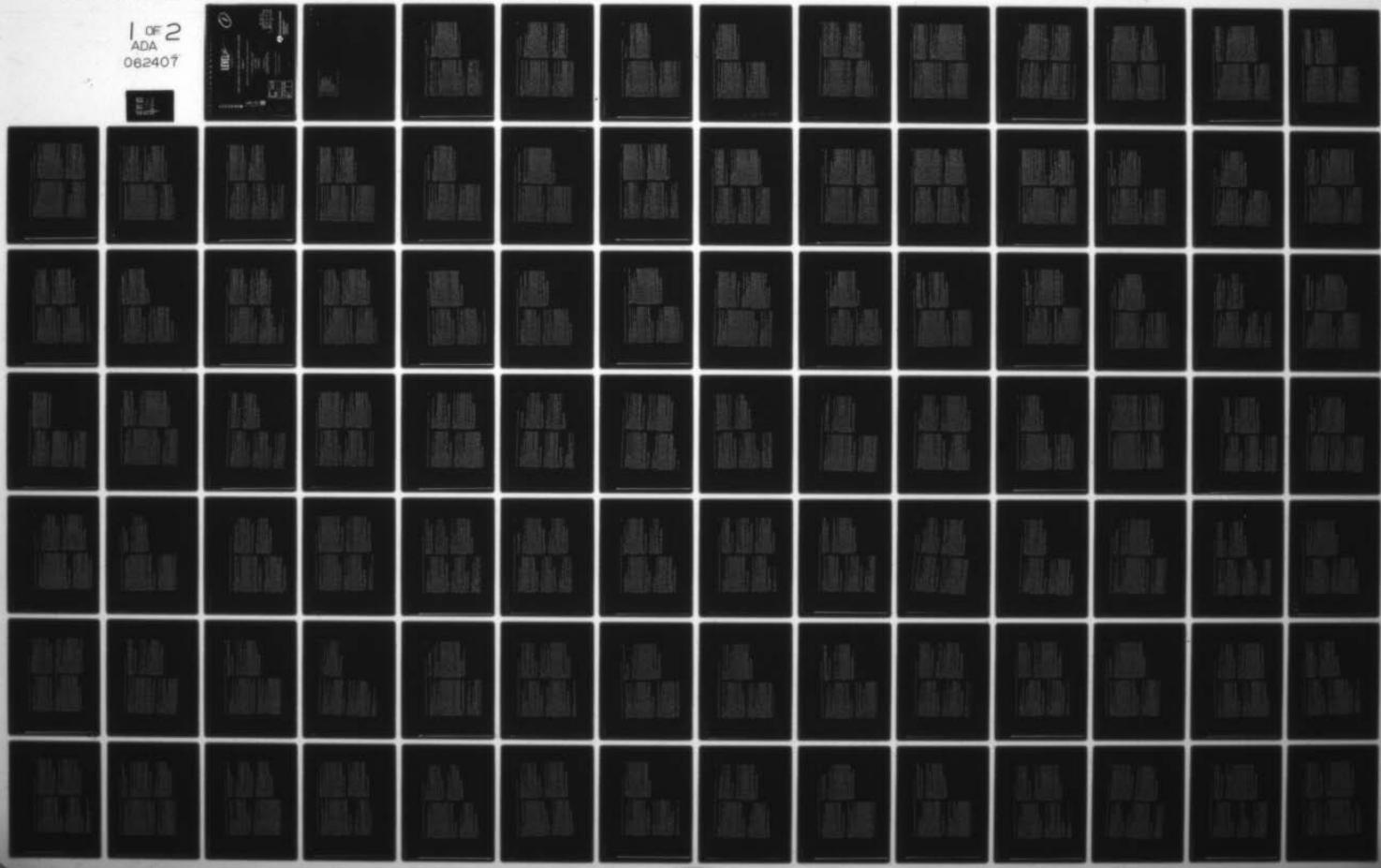
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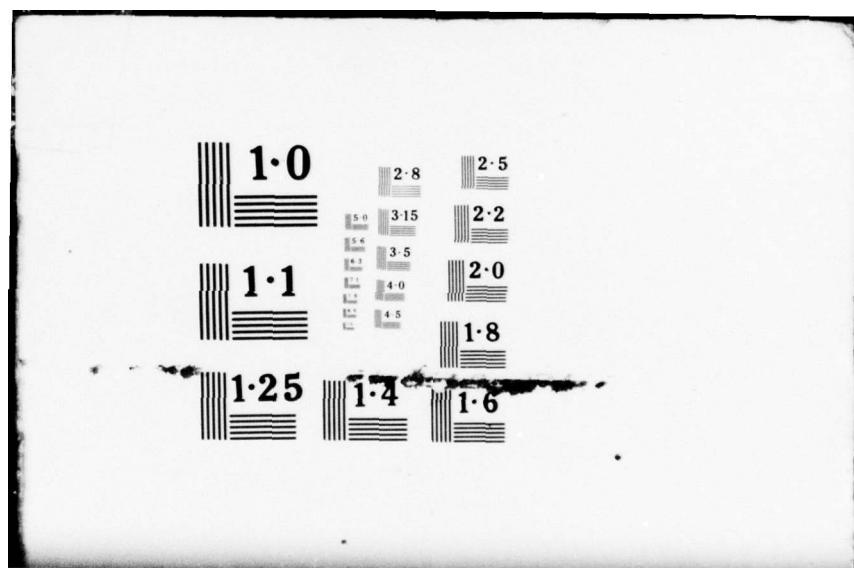
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C78-299/501-VOL-2

1 OF 2  
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Set Items Description

- 1 0 HYBRID MICRO CIRCUIT?
- 2 0 HYBRID MICRO CIRCUITS
- 3 0 HYBRID MICROCIRCUIT?
- 4 0 HYBRID MICROCIRCUIT?
- 5 0 THICK(W) IC(W) CIRCUIT?
- 6 0 THICK(W) IC(W) CIRCUIT?
- 7 3 THICK FILM CIRCUIT
- 8 178 THICK FILM CIRCUITS
- 9 205 THIN FILM CIRCUITS
- 10 504 HYBRID INTEGRATED CIRCUITS
- 11 45 40R7-9
- 12 0 ANDTANDABND9
- 13 318 40R70R809
- 14 318 40R70R809

Print 145/1-308

Search Time: 0.057 Prints: 388 Descs.: 0

Language: SLOVENE

109794 C7702314B A VERSATILE, EASILY ASSIMILATED MICROCOMPUTER FOR INSTRUMENTATION DEVELOPMENT APPLIED TO DIRECT PHOTOGRAPHIC MASK GENERATION. D'LUNA, L.J.; LUGAS, M.S.P.; GALLAGHER, R.P.; DEPT. OF ELECTRICAL ENGRG., KANSAS STATE UNIV., MANHATTAN, KS, USA. IEE CONFERENCE PROCEEDINGS ON INDUSTRIAL APPLICATIONS OF MICROPROCESSORS, 17-9, 1977 21-23 MARCH 1977 PHILADELPHIA, PA., USA. A LOW-COST MICROCOMPUTER WITH AN APPLICATION TO DIRECT PHOTOGRAPHIC MASK GENERATION IS DESCRIBED. THE MICROCOMPUTER PERFORMS AN EFFORT TO EXTEND THE POWER OF MICROPROCESSOR DEVICES. AN EFFORT TO SOLVE 10 SYSTEMS WHERE THE MICROCOMPUTER REPRESENTS A SIGNIFICANT PORTION OF THE TOTAL SYSTEM COST, 512 BYTES OF 170-A ROM AND 256 BYTES OF RAM WITH THE CPU AND ALL ASSOCIATED CONTROL CIRCUITRY ARE CONTAINED ON A SINGLE 3.5" X 4" X 4.5" SELFCOATED CARD. THE MICROCOMPUTER SPEEDS PROTOTYPING DEVELOPMENT BECAUSE IT IS TREATED AS A MODULE IN SYSTEM DESIGN. THE TIME-CONSUMING PREPARATION OF CUT-MASTER AND CUT CIRCUIT FOR THICK-FILM FABRICATION HAS BEEN ELIMINATED BY INCORPORATING THE MICROCOMPUTER IN A DIRECT PHOTOGRAPHIC MASK GENERATION SYSTEM. PAD LOCATIONS ARE ENTERED WITH A KEYBOARD AND THE PATTERN IS TRANSFERRED TO PHOTOGRAPHIC FILM BY CONTROLLING THE MOTEMENT OF AN X-Y TABLE WITH RESPECT TO A COLIMMATED LIGHT SOURCE (2 REFS). Description: MASKS; COMPUTERISED CONTROL; DIRECT PHOTOGRAPHIC MASK GENERATION; SYSTEM COST; CONTROL CIRCUITRY; KEYBOARD; COLLIMATED LIGHT SOURCE; CUT MASTER ARTWORK TIME CONSUMING PREPARATION; THICK FILM CIRCUIT; PAD LOCATION 06 Section Class Codes: C7490, C3370N

109795 B7702245, C7702297 MICROCOMPUTER IN THE THIN FILM HYBRID TECHNOLOGY BULIC, A.; BUTINA, V.; GRUDEN, D.; HERCIG, D.; JERVOL, P.; KERIĆ, A.; MOSTEVC, D.; LOKOVČEK, J.; MAJČEN, J.; MESAR, J.; MLAJAR, J.; RAJČ, A.; PRELOVEK, A.; RAJČ, D.; RAZIVČER, J.; RODMAN, V.; RUMIĆ, F.; SELVIK, T.; STAVANJA, P.; STREL, D.; TRONTELJ, J.; TRONTELJ, L. ELEKTROTEH. VESTN. (YUGOSLAVIA) VOL.43, NO.4 189-92 SEPT-OCT 1976. Content: ELEA2 A SURVEY OF THE MICROCOMPUTER FE A20 IS GIVEN IN THE PAPER AS AN EXAMPLE OF APPLICATION OF THIS TECHNOLOGY Description: HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS; MICROCOMPUTERS 02 Section Class Codes: U2220J, H2220E, C5410

1092802 B7703254 RESISTANCE IN GOLD ALUMINUM INTERCONNECTS WITH TIME AND TEMPERATURE BUSNIRE, D.W. SANDA LABS., ALBUQUERQUE, NM, USA. IEE TRANS., PARIS, HYBRIDS AND PACKAG. (USA) VOL. PHP-13. NO.2 152-6 JUNE 1977 Content: IEPHA A INCREASES IN THE RESISTANCE OF GOLD ALUMINUM INTERCONNECTS WITH TIME AND TEMPERATURE WERE INVESTIGATED. ALUMINUM WIRE WAS ULTRASONICALLY BONDED TO CR-AU AND TiPO-AU THIN-FILM METALLIZATION ON CERAMIC SUBSTRATES. THE INTERCONNECTS WERE EXPOSED TO TEMPERATURES FROM 150 TO 300 DEGREES FOR TIMES UP TO 400 H. THE RESISTANCE OF THE INTERCONNECTS WERE MEASURED PERIODICALLY DURING THE EXPOSURE TO Elevated TEMPERATURES. THERE WERE SIGNIFICANT INCREASES IN RESISTANCE ON BOTH TYPES OF METALLIZATION. SOME MEASUREMENTS INDICATED ELECTRICALLY OPEN INTERCONNECTS, BUT THE MECHANICAL STRENGTH REMAINED HIGH. IF SYSTEMS CONTAINING GOLD ALUMINUM INTERCONNECTS ARE ANTICIPATED TO BE PROCESSED OR USED AT ABOVE 150 DEGREE SC, SERIOUS CONSIDERATION SHOULD BE GIVEN TO THE EFFECTS OF INCREASED RESISTANCE ON CIRCUIT PERFORMANCE (B.R.-S) Description: LEAD BONDING; METALLISATION: GOLD; ALUMINUM; ULTRASONIC APPLICATIONS; THIN FILM CIRCUITS; CONTACT RESISTANCE; HYBRID INTEGRATED CIRCUITS Identifiers: AU; AL INTERCONNECTS; ULTRASONIC WIRE BONDING; EXPERIMENTAL RESULTS; CR-AU THIN FILMS METALLISATION; TiPO-AU THIN FILM METALLISATION; TEMPERATURE EFFECTS; TIME EFFECTS; RESISTANCE INCREASES 02 Section Class Codes: B2240, B7820, B2220J

1092803 B7703255, C7703297 MICROCOMPUTER IN THE THIN FILM HYBRID TECHNOLOGY BULIC, A.; BUTINA, V.; GRUDEN, D.; HERCIG, D.; JERVOL, P.; KERIĆ, A.; MOSTEVC, D.; LOKOVČEK, J.; MAJČEN, J.; MESAR, J.; MLAJAR, J.; RAJČ, A.; PRELOVEK, A.; RAJČ, D.; RAZIVČER, J.; RODMAN, V.; RUMIĆ, F.; SELVIK, T.; STAVANJA, P.; STREL, D.; TRONTELJ, J.; TRONTELJ, L. ELEKTROTEH. VESTN. (YUGOSLAVIA) VOL.43, NO.4 189-92 SEPT-OCT 1976 Content: ELEA2 A SURVEY OF THE MICROCOMPUTER FE A20 IS GIVEN IN THE PAPER AS AN EXAMPLE OF APPLICATION OF THIS TECHNOLOGY Description: HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS; MICROCOMPUTERS 02 Section Class Codes: U2220J, H2220E, C5410

1092643 B77032043  
DESIGN AND PROCESS CONSIDERATIONS FOR HYBRID ACTIVE FILTER  
APPLICATIONS  
SRIID, R.E.  
HELIOPOT DIV., BECKMAN INSTRUMENTS INC., FULLERTON, CA, USA

1977 IEEE INTERNATIONAL SYMPOSIUM ON CIRCUITS AND SYSTEMS  
PROCEEDINGS 309-12 1977  
25-27 APRIL 1975 PHOENIX, ARIZ., USA  
IEEE NEW YORK, USA  
A CHRONOLOGY OF PRODUCT DEVELOPMENT SHOWS THE EVOLUTION OF ACTIVE RC FILTERS, AND PROCESS TECHNIQUES FOR CONSTRUCTION OF ACTIVE RC FILTERS. CERTAIN THICK FILM CIRCUITS FOR THE TELECOMMUNICATIONS INDUSTRY WERE DESIGNED TO BE ACTIVELY TUNED TO VALUE. AT THIS JUNCTURE, THE DECISION WAS MADE TO ACTIVELY FUNCTIONALLY TUNE THE FILTER PARAMETERS OF CENTER FREQUENCY, Q, AND GAIN. THIS WAS ACCOMPLISHED USING A COMPUTER-CONTROLLED LASER SYSTEM WHICH WAS THEN EXTENDED TO PRECISION MILITARY FILTER APPLICATIONS. TO MEET THESE TIGHTER REQUIREMENTS, ANOTHER FILTER WAS DEVELOPED WHICH EMPLOYED THIN FILM TECHNOLOGY TO INCREASE LINE AND TEMPERATURE STABILITY (6 Refs.)  
Descriptors: ACTIVE FILTERS; INTEGRATED CIRCUIT TECHNOLOGY; THICK FILM CIRCUITS; THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; PROCESS TECHNIQUES; ACTIVE RC FILTERS; THICK FILM DESIGN; THIN FILM TECHNOLOGY; TEMPERATURE STABILITY; ACTIVE TRIMMING; COMPUTER CONTROLLED LASER SYSTEM  
05

Section Class Codes: B1270E, B22200

1092322 B77031396  
NONHERMETICITY OF POLYMERIC LID SEALANTS  
TRACER, R.K.  
SANDIA LABS., ALBUQUERQUE, NM, USA  
IEEE TRANS. PARTS, HYBRIDS AND PACKAG. (USA) VOL. PHP-13.  
NO. 2 JUNE 1977 Coden: IEPHA  
ORGANIC ADHESIVES ARE USEFUL LID SEALANTS BECAUSE THEY ARE PROCESSED AT LOW TEMPERATURES, ARE INEXPENSIVE, AND ARE EASY TO REMOVE. HOWEVER, THERE HAS BEEN CONCERN ABOUT THE DEGREE OF PROTECTION ORGANICS CAN PROVIDE MOISTURE-SENSITIVE COMPONENTS. DATA PRESENTED IN THIS PAPER SHOW THAT ORGANIC ADHESIVES CAN SEAL PACKAGES WHICH PASS GROSS AND FINE LEAK TESTS BUT ALLOW WATER VAPOR TO PERMEATE RAPIDLY. PERMEATION MEASUREMENTS ON HYBRID MICROCIRCUIT PACKAGES GAVE SEAL PERMEABILITIES OF 3-7 X 10<sup>15</sup> G/CH-S<sup>1/2</sup> (15 Refs.)

1092322 B77031396  
NONHERMETICITY OF POLYMERIC LID SEALANTS  
TRACER, R.K.  
SANDIA LABS., ALBUQUERQUE, NM, USA  
IEEE TRANS. PARTS, HYBRIDS AND PACKAG. (USA) VOL. PHP-13.  
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ORGANIC ADHESIVES ARE USEFUL LID SEALANTS BECAUSE THEY ARE PROCESSED AT LOW TEMPERATURES, ARE INEXPENSIVE, AND ARE EASY TO REMOVE. HOWEVER, THERE HAS BEEN CONCERN ABOUT THE DEGREE OF PROTECTION ORGANICS CAN PROVIDE MOISTURE-SENSITIVE COMPONENTS. DATA PRESENTED IN THIS PAPER SHOW THAT ORGANIC ADHESIVES CAN SEAL PACKAGES WHICH PASS GROSS AND FINE LEAK TESTS BUT ALLOW WATER VAPOR TO PERMEATE RAPIDLY. PERMEATION MEASUREMENTS ON HYBRID MICROCIRCUIT PACKAGES GAVE SEAL PERMEABILITIES OF 3-7 X 10<sup>15</sup> G/CH-S<sup>1/2</sup> (15 Refs.)  
Descriptors: EPONALS IN THE LITERATURE. WITH THIS PERMEABILITY RANGE AND THE PACKAGE CONFIGURATION USED IN THIS STUDY, THE INTERIOR HUMIDITY OF A PACKAGE WILL REACH 50 PERCENT OF THE EXTERIOR HUMIDITY IN 6-10 H (15 Refs.)  
Identifiers: ENCAPSULATION; POLYMERS  
Packages: HYBRID MICROCIRCUIT  
G/CN-S-TORR PERMEABILITIES; 3 TO 7 X 10<sup>15</sup> G/CH-S<sup>1/2</sup> MEASUREMENTS;  
SEMICONDUCTOR DEVICE ENCAPSULATION; NONHERMETICITY;  
IC  
02

Section Class Codes: B0170J

1092637 B77028422 C77020548  
SPECIAL REPORT ACTIVE FILTERS RIDE THE CREST OF NEW TECHNOLOGY  
RIZENMAN, M.J.  
ELECTRONICS (USA) VOL. 50, NO. 11 119-24 26 MAY 1977

1092637 B77028422 C77020548  
SPECIAL REPORT ACTIVE FILTERS RIDE THE CREST OF NEW TECHNOLOGY  
RIZENMAN, M.J.  
ELECTRONICS (USA) VOL. 50, NO. 11 119-24 26 MAY 1977  
Codon: ELECAD  
01-EF OF AMPS, IMPROVED THICK-FILM INKS, AND COMPUTER OPTIMIZED DESIGN ARE DISCUSSED (13 Refs.)  
Descriptors: CIRCUIT CAD; HYBRID INTEGRATED CIRCUITS;  
OPERATIONAL AMPLIFIERS; THICK FILM CIRCUITS; ACTIVE FILTERS;  
OPERATIONAL AMPLIFIERS; ACTIVE FILTERS; NEW TECHNOLOGY; BIFET  
OPERATIONAL AMPLIFIERS; THICK FILM INKS; COMPUTER OPTIMISED DESIGN  
02

Section Class Codes: B1270E, B1220, B2220G, C74100

1092642 B77032042  
A SET OF THICK FILM R-C ACTIVE FILTERS FOR PCM APPLICATION  
SIN, D.M.  
GTE LUMIHT INC., SAN CARLOS, CA, USA  
1977 IEEE INTERNATIONAL SYMPOSIUM ON CIRCUITS AND SYSTEMS  
PROCEEDINGS 304-9 1977  
21-27 APRIL 1975 PHOENIX, ARIZ., USA  
IEEE NEW YORK, USA  
WIDE TOLERANCE EQUAL VALUED CAPACITORS ARE USED FOR EASIER PRODUCTION, EQUAL COST, AND A VERY FAST DETERMINISTIC TRIMMING PROCEDURE IS USED FOR HIGH VOLUME PRODUCTION. THE FIRST PART OF THE PAPER DESCRIBES SPECIFIC CIRCUITS AND DESIGN METHODS USED. IN THE SECOND PART THE TRIMMING PROCEDURES ARE DESCRIBED. A DISCUSSION OF THE PERFORMANCE OF THE FILTERS AND FUTURE DEVELOPMENTS FOLLOWS (11 Refs.)  
Descriptors: ACTIVE FILTERS; INTEGRATED CIRCUIT TECHNOLOGY;  
PULSE-CODE MODULATION; THICK FILM CIRCUITS  
Identifiers: PCM; EQUAL VALUED CAPACITORS; PRODUCIBILITY;  
COST; DETERMINISTIC TRIMMING; PROCEDURE; HIGH VOLUME PRODUCTION  
01

1086133 877028624. C77020104  
FUSING MECHANISM OF NICHROME THIN FILMS  
D. V. DODSON, J. L. GIBSON, J. D. ROSSITER, T. J. J. HARRIS, S. A.  
HARRIS SEMICONDUCTOR, MELBOURNE, F.L., USA  
DODGE ELECTRIC, (FRANCE) VOL.57, NO.5 373-80 MAY 1977  
Code: OMELAS  
Conduction electrons in nichrome have a short meanfree path. This maximizes I<sup>2</sup>R heating and precludes electron migration in the direction of electron flow as a fusing mechanism. Transmission electron microscopy is the only effective analytical tool to characterize the programmed use gap structure. Programming fusible nichrome is done by molten metal (nickel, chrome, long, moving, in the presence of an electric field. The final structure resembles a frozen splash and is described by fluid dynamics. Thermal analysis coupled with empirical programmed fuse data indicate a threshold power density for fusing. If this power density is exceeded, which can be assured if the programming time utilized is as specified, the fuse gap will be wide and reliable. If this power density threshold is only matched, it is possible to create a marginal fuse. Life test results indicate programmed power density is equivalent to devices of the same circuitarity that do not utilize fusible liths (25 refs.)  
Directors: READ-ONLY STORAGE: THIN FILM CIRCUITS  
Identifiers: NICHROME THIN FILMS: MEANFREE PATH;  
ELECTRON MIGRATION: FUSE GAP STRUCTURE: FLUID DYNAMICS;  
THRESHOLD POWER DENSITY: PROGRAMMED PROM: FUSING MECHANISM;  
THIN FILM ANALYSIS: TRANSMISSION ELECTRON MICROSCOPY  
02  
Section Class Codes: B2220E. B2190. C5320Z  
Language: FRENCH

1070111 877024610. C77018862  
RESEARCH INSTITUTE FOR TELECOMMUNICATION INDUSTRY (THICK AND  
THIN FILM CIRCUITS)  
MIRALAS TECHNIKA (HUNGARY) VOL.27. NO.12 357-8 DEC.  
1971. Coden: MIRAG  
A brief report is given of the activities of the institute in the field of thin and thick film integrated circuits developed to customers' requirements. The result of several years' design effort is a family of active RC filters and a system of computer programs which enables the design and realization in hybrid integration of minimum cost filter systems matched to given tolerance scheme. The structures of a voltage-to-frequency converter (MUF-01) and 4/10 bit D/A converters are outlined.  
Directors: THIN FILM CIRCUITS: THICK FILM CIRCUITS: ACTIVE FILTERS; CONVERTERS: CIRCUIT CAD: DIGITAL-ANALOGUE CONVERSION  
1. Directors: INTEGRATED CIRCUITS: ACTIVE RC FILTERS: D/A CONVERTERS: VOLTAGE FREQUENCY CONVERTOR: HUNGARY: THIN FILM  
02  
Section Class Codes: 02220E. B1270E. B1290B. B2220G. B1130B.

C7410D Language: HUNGARIAN

1070189 877026440  
THICK FILM NICKEL CONDUCTORS FOR DC GAS DISCHARGE DISPLAYS  
PATTERSON, F. K.; MARCUS, S. M.; BACHER, R. J.  
ELECTRONIC MATERIALS DIV., PHOTO PRODUCTS DEPT., DUPONT CO.,  
WILMINGTON, DE, USA  
INF. INF. DISP. (USA) VOL.13. 24-5 SPRING 1977 Coden:  
INFAB  
INFAB DISCUSSES A LOW-FIRING, NICKEL-CONDUCTOR COMPOSITION, DUPONT NO. 9530, PROCESSABLE ON SODA-LIME GLASS TO FORM CATHODES. IT ALSO MAKES AVAILABLE COMPATIBLE DIELECTRIC AND SILVER COMPOSITIONS FOR THE AIR-FIREABLE NICKEL METALLIZATION OF SPECIAL SIGNIFICANCE. FIRING IN A CONVENTIONAL AIR-FLOW BELT FURNACE ELIMINATES THE NEED FOR ATMOSPHERE CONTROL  
Descriptors: DISPLAY DEVICES: GAS-DISCHARGE TUBES; THICK FILM CIRCUITS: CONDUCTORS (ELECTRIC)  
Identifiers: DC GAS DISCHARGE DISPLAYS: DC PLASMA PANEL DISPLAYS; ALL GLASS DISPLAY: LOW FIRING TEMPERATURE NI CONDUCTOR COMPOSITION; THICK FILM NI CONDUCTORS; AIR FIREABLE THICK FILMS; SODA LIME GLASS COMPATIBLE THICK FILMS  
02  
Section Class Codes: B7260. B2220G. B2380

1068966 A77044397, B77024894  
ETCH SPUTTERING OF BULK MATERIALS UNDER CONTROLLED ATMOSPHERE. C.: SIMONETTI, E.  
SELVIA INDUSTRIE ELETTRONICHE ASSOCIATE SPA, ROMA, ITALY  
VIDE (FRANCE) VOL. 31, NO. 184 13B-41 AUG.-OCT. 1978  
Codice: VIDEAA  
The authors have investigated rf etch sputtering of bulk Ge and InSb under a controlled atmosphere of air with either 0/sub 2/ or N/sub 2/O/sub 2/ or H/sub 2/O/sub 2/ or H/sub 2/Sb 2:10. The etch rates were measured as a function of the atmosphere, and surfaces observed by SEM. The results have been applied to the elimination of contamination as well as to minimizing the thickness of masking material. The optimization of the atmosphere during etch sputtering has led to the fabrication of thin film microwave circuits with minimum masking thickness and excellent definition. (9 refs.)  
Durchsetzr.: R. F. SPUTTERING; ETCHING: GERMANIUM; INDIUM; ANTIMONY; ILL-V SEMICONDUCTORS; ELEMENTAL SEMICONDUCTORS; SEMICONDUCTOR TECHNOLOGY; SCANNING ELECTRON MICROSCOPE EXAMINATION OF MATERIALS; THIN FILM CIRCUITS; SCANNING ELECTRON MICROSCOPE EXAMINATION OF MATERIALS  
Identifiers: BULK MATERIALS; CONTROLLED ATMOSPHERE; RF ETCH SPUTTERING; GE; INSB; ETCH RATES; SEM; CONTAMINATION; MASKING MATERIAL; THIN FILM MICROWAVE CIRCUITS; SEMICONDUCTOR  
02  
Section Class Codes: A8160, B2550E, B2220E

1068734 B77024626  
THIN FILM RESISTOR NETWORKS IN HYBRID CIRCUITS  
GROTH, L. HELIOPOT DIV., BECHMAN INSTRUMENTS INC., FULLERTON, CA, USA  
SOLID STATE TECHNOL. (USA) VOL. 20, NO. 3 45-9 MARCH 1977  
Codice: SSTEAP  
The use of thin film precision resistor networks is increasing in thick film hybrids, where their tighter tolerances, lower TCR, better TCR tracking and small size make possible better performance at higher packaging densities. This article discusses the advantages and disadvantages of thin film chip networks, the design with chip networks and chip design are outlined. Several hybrid converters and an active filter are discussed to illustrate the thick film/thin film hybrid combination. (3 refs.)  
Described: THIN FILM RESISTORS; THIN FILM CIRCUITS; THICK FILM RESISTORS; THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS  
Identifiers: HYBRID CIRCUITS; THICK FILM HYBRIDS; TCR; HYBRID DESIGN; HYBRID CONVERTERS; ACTIVE FILTER; THIN FILM RESISTOR NETWORKS; THICK FILM RESISTOR NETWORKS; TEMPERATURE COEFFICIENT OF RESISTANCE  
02  
Section Class Codes: B2220J, B2220E, B2120

1068737 B77024629  
APPLICATION OF TAPE AUTOMATED BONDING TECHNOLOGY TO HYBRID MICROCIRCUITS  
D'ALOISIO, R.G.; DE MIRANDA, W.R.  
WHITEHORN INC., ST. PETERSBURG, FL, USA  
SOLID STATE TECHNOL. (USA) VOL. 20, NO. 3 33-8 MARCH 1977  
Codice: SSTEAP  
The present tape automated bonding (TAB) technology is reviewed under the following eight headings: (1) wafer metallization at chip connection pads; (2) substrate manufacturing; (3) tape carrier manufacturing; (4) die separation; (5) inner lead bonding (ILB); (6) outer lead bonding (OLB); (7) electrical testing; (8) rework methodology (4 refs.)  
Described: INTEGRATED CIRCUIT MANUFACTURE; INTEGRATED CIRCUIT TECHNOLOGY; HYBRID INTEGRATED CIRCUITS; LEAD BONDING  
Identifiers: TAPE AUTOMATED BONDING TECHNOLOGY; HYBRID MICROCIRCUITS; SUBSTRATE MANUFACTURING; CARRIER MANUFACTURING; DIE SEPARATION; INNER LEAD BONDING; ILB; OUTER LEAD BONDING; OLB; TAPE TECHNOLOGY; INTEGRATED CIRCUIT MANUFACTURING  
02  
Section Class Codes: B22240, B22220

78 12 05 018

106733 877024625  
SCREENING PROCEDURE FOR ADHESION DEGRADATION DUE TO SOLDER  
LEACHING IN THICK-FILE HYBRID MICROCIRCUITS  
LEVIN, S. S.  
WATTHOUSE ELECTRIC CORP., BALTIMORE, MD, USA  
SOLID STATE TECHNOL. (USA) VOL.20, NO.3 39-44 MARCH  
1977 Coden: SSTEAP

THE RESULTS OF AN EXPERIMENT TO DETERMINE THE PROCEDURES TO PRECLUDE EXCESSIVE ADHESION DEGRADATION DUE TO SOLDER LEACHING IN GOLD ALLOY/SOLDER SYSTEMS IN THICK-FILE HYBRID MICROCIRCUITS ARE DESCRIBED. THESE RESULTS INCLUDE A COMPARATIVE RATING AMONG THE MATERIALS TESTED, ALONG WITH CRITERIA FOR RATING DIFFERENT MATERIALS. FOUR ENVIRONMENTAL STRESSES WERE COMBINED TO DETERMINE WHICH ONE TO USE AS A QUALITY ASSURANCE TEST FOR ADHESION DECAY. THE RESULTS ARE PRESENTED TO SHOW THE RELATIVE DEGRADATIONS OF THE DIFFERENT MATERIALS. BASED ON THE RESULTS OF THE EXPERIMENT, THE TEMPERATURE CYCLING STRESS APPEARS TO BE THE MOST PRACTICAL STRESS TO USE AS A SCREENING PROCEDURE FOR SOLDER LEACHING. GUIDELINES ARE PRESENTED FOR PERFORMING THE SCREENING TEST AND DETERMINING A RATING FOR ANY MATERIAL COMBINATION. (7 Refs)

Descriptors: QUALITY CONTROL; THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS

Identifiers: ADHESION DEGRADATION; SOLDER LEACHING; PHOTOLYTIC SCREENING; QUALITY ASSURANCE; COLD ALLOY/SOLDER SYSTEMS; TEMPERATURE CYCLING STRESS; SCREENING PROCEDURE; THICK FILM HYBRID MICROCIRCUITS; INTEGRATED CIRCUIT SCREENING

Section Class Codes: B2220J, B0170L, B2220G

A FAST-RESPONSE DUAL CONTROLLED COMPARATOR EMPLOYING HYBRID-THIN-FILE CONSTRUCTION  
BAMNIKAROV, G. D.; MASHOV, V. M.; VAVILOV, V. A.; VENTSEL, G. I.  
RADIOTEKHNIKA, MOSKVA (USSR) VOL.31, NO.5 80-4  
Trans. of: TELECOMUN. AND RADIO ENG. PART 2 (USA) VOL.31,  
NO.5 107-9 MAY 1976 Coden: TRECBB  
MODERN TRENDS IN THE DEVELOPMENT OF FAST-RESPONSE  
COMPARATORS AND THEIR PARAMETERS ARE DISCUSSED. A DIFFERENTIAL  
TYPE OF COMPARTOR EMPLOYING A HYBRID-THIN-FILE CONSTRUCTION  
IS DESCRIBED. THE APPLICATION POSSIBILITIES OF COMPARATORS ARE  
EXAMINED. (7 Refs)

Decoders: COMPARATORS  
Associators: CIRCUITS (CIRCUITS); HYBRID INTEGRATED  
CIRCUITS; THIN FILM CIRCUITS

Identifiers: DUAL CONTROLLED COMPATOR; HYBRID THIN FILM  
CIRCUITS; FAST RESPONSE; DIFFERENTIAL TYPE COMPATOR

Section Class Codes: B1290, B2220J, B2220E

1052209 877024622  
MASKS FOR PRINTING THICK-FILE CIRCUITS

DUREY, G. C.  
SOLID STATE PHYS. LAB., DELHI, INDIA  
MICROELECTRON. AND RELIAB. (GB) VOL.16, NO.1 69-73  
1976 Coden: NCRLAS  
THICK-FILE CIRCUITS ARE PRINTED ON ALUMINA SUBSTRATES BY  
OFF-CONTACT OR CONTACT PRINTING PROCESS THROUGH A CORRECTLY  
GENERATED PATTERN ON SCREENS. THE PRESENT PAPER DESCRIBES  
THESE AND COMPARES THE VARIOUS TYPES USED FOR PRINTING  
THICK-FILE CIRCUITS. THOUGH METAL MASKS ARE SUITABLE FOR FINE  
LINE PRINTING, FOR MOST APPLICATIONS SENSITIZED BICHROMATED  
EMULSIONS OR DIAZO EMULSIONS CAN BE USED TO GENERATE A MASK  
(14 Refs)

Descriptors: THICK FILM CIRCUITS; MASKS; INTEGRATED CIRCUIT  
TECHNOLOGY

Identifiers: ALUMINA SUBSTRATES; CONTACT PRINTING;  
BICHROMATED EMULSIONS; DIAZO EMULSIONS; MASK; OFF CONTACT  
PRINTING; THICK FILM CIRCUITS

Section Class Codes: B2220G

106731 877024623  
HYBRID THICK-LAYER TECHNIQUE IN MICRO ELECTRONICS  
POLYTECH. TILDSCH. ELEKTROTECH. ELEKTRON. (NETHERLANDS)  
VOL.12, NO.4 201-4 APRIL 1977 Coden: PTEB  
CIRCUITS, HYBRID THICK-LAYER TECHNIQUES WITH THIN-LAYER ONES  
AND MONOLITHIC INTEGRATED CIRCUITS. PRODUCTION METHOD AND  
PHOTONITRILES OF THICK-LAYER CIRCUITS ARE DISCUSSED. THEY ARE  
USED IN MEDICAL EQUIPMENT, SPACE TECHNOLOGY, MILITARY  
APPARATUS, TELECOMMUNICATIONS, AND CONSUMER GOODS. RELATIVE  
COSTS OF HOUSING (CARBONATING) METHODS ARE TACULATED  
Developers: INTEGRATED CIRCUIT TECHNOLOGY; THICK FILM  
CIRCUITS; THIN FILM CIRCUITS; INTEGRATED CIRCUIT MANUFACTURE;  
Hybrid: MICRO ELECTRONICS; MONOLITHIC INTEGRATED  
CIRCUITS; HYBRID THICK LAYER TECHNIQUES; HYBRID THIN LAYER  
Techniques: CAPSULATION  
02  
Section Class Codes: B2220J, B2220G, B2220E  
Language: DUTCH

1067395 877024625

1051272 B77013120. C77011215  
COMPUTER-AIDED THERMAL ANALYSIS OF A HYBRID MULTISTAGE  
ACTIVE BANDPASS FILTER/AMPLIFIER  
COKK, K. D., JR.; KERNS, D. V., JR.; NAGLE, H. T., JR.; SLAGH,  
T. D.; RUNE, V. W.  
DEPT. OF ELECTRICAL ENGRG., AUBURN UNIV., AUBURN, AL, USA  
1117 TRANS. PARTS, HYBRIDS AND PACKAG. (USA) VOL.PHP-12,  
NO.4, 314-50, DEC. 1976. Coden: IEPHA  
Describes the thermal analysis and conditioner for an infrared tracking system. It is the purpose of this paper to describe the use of computer-aided analysis to determine the thermal performance of the circuit and to present a computer-aided approach to the thermal design of hybrid microelectronic circuits. Thermal analysis and measurements are made revealing the temperature distribution and power-dissipating capability. These results also provide design guidelines for the layout of heat-dissipating devices such as amplifier chips. Package convection and radiation as well as internal heat conduction are modeled using mode point analysis. Temperature measurements provide verification of the thermal model. (5 Refs)

Descriptors: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; ACTIVE FILTERS; BAND-PASS FILTERS; COMPUTER-AIDED ANALYSIS; THERMAL ANALYSIS  
Identifiers: HYBRID FILTER/AMPLIFIER; SIGNAL AMPLIFIER; THERMAL DESIGN; TEMPERATURE DISTRIBUTION; COMPUTER-AIDED THERMAL ANALYSIS; SIGNAL CONDITIONER; POWER DISSIPATING CAPABILITY; LAYOUT DESIGN GUIDELINES  
02

Section Class Codes: B1270E, B2220J, B2220G, B1130B, C7410D

1051273 B77013120. C77011215  
LOW-NOISE DESIGN CONSIDERATIONS ARE DISCUSSED (7 Refs)  
Identifiers: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; ACTIVE FILTERS; SA, C-PASS FILTERS; CIRCUIT ANALYSIS; COMPUTING  
Identifiers: MULTISTAGE ACTIVE BANDPASS FILTER/AMPLIFIER; 1 X 2 IN ALUMINA SUBSTRATE; CHIP RESISTORS; CHIP CAPACITORS; BLOCK DIAGRAM; TRANSFER FUNCTIONS; PREDICTED GAIN PEAK; MEASURED BANDPASS; EXPERIMENTAL RESULTS; COMPUTER SIMULATION; NOISE SOURCES; OPERATIONAL AMPLIFIER; MACROCODE; THICK FILM RESISTORS; CHARACTERISATION; THICK FILM CIRCUITS; SIGNAL CONDITIONER;  
02  
Section Class Codes: B1270E, B2220J, B2220G, B1130B, C7410D

1049332 A77040624. B77016557  
CHARACTERIZATION OF METAL-OXIDE SYSTEMS BY HIGH RESOLUTION ELECTRON SPECTROSCOPY  
SCHLEIBER, E. J.; HICKLIN, W. H.  
GEORGIA INST. OF TECHNOL., ATLANTA, GA, USA  
US ARMY  
PROCEEDINGS OF THE 30TH ANNUAL SYMPOSIUM ON FREQUENCY CONTROL 24-8 1976  
2-4 JUNE 1976 ATLANTIC CITY, N.J., USA  
ELECTRONIC INDUSTRIES ASSOC., WASHINGTON, D.C., USA  
The research described is directed towards a knowledge of the chemical reactions that take place between a reactive metal electrode and the quartz crystal. Systems included in the discussion are the metal-oxide system, Al-Al<sub>2</sub>Sub<sub>3</sub> and a grown silicon dioxide film on silicon high energy resolution Auger electron and x-ray photoelectron spectra obtained using a double-pass cylindrical mirror analyzer with retarding grisms are presented. The intensities and shapes of Auger and photoelectron peaks for the metal and its oxide are examined analytically. Chemical shift information for the different metal-oxide systems provides a means for the identification of intermediate solid phases at metal-oxide interfaces. Potential applications to the study of interfaces in quartz resonators, charge coupled devices, surface acoustic wave devices and hybrid microcircuits are mentioned. (20 Refs)  
Descriptors: CRYSTAL RESONATORS; ELECTRON SPECTROSCOPY; AUGER EFFECT; CHEMICAL SHIFT; METAL-INSULATOR BOUNDARIES;  
INTEGRATED CIRCUIT TESTING  
Identifiers: HIGH RESOLUTION ELECTRON SPECTROSCOPY; CHEMICAL REACTIONS; REACTIVE METAL ELECTRODE; QUARTZ CRYSTAL; X-RAY PHOTOELECTRON SPECTRA; CHARGE COUPLED DEVICES; SURFACE ACOUSTIC WAVE DEVICES; HYBRID MICROCIRCUITS; METAL/OXIDE SYSTEM CHARACTERISATION; AUGER ELECTRON SPECTRA;  
06  
Section Class Codes: A8280P, B0590, B2860

1051274 B77013119. C77011214  
THE HYBRID INTEGRATION OF A MULTISTAGE ACTIVE BANDPASS FILTER/AMPLIFIER  
CHOK, K. D., JR.; KERNS, D. V., JR.; NAGLE, H. T., JR.; SLAGH,  
T. D.; RUNE, V. W.  
DEPT. OF ELECTRICAL ENGRG., AUBURN UNIV., AUBURN, AL, USA  
1117 TRANS. PARTS, HYBRIDS AND PACKAG. (USA) VOL.PHP-12,  
NO.4, 316-44, DEC. 1976. Coden: IEPHA  
Describes the fabrication, characterization, and analysis of a thick-film hybrid circuit to be used as a signal amplifier and conditioner for an infrared tracking system. The entire circuit is integrated on a 1 X 2 in alumina substrate using thick-film resistors and conductors. Some chip resistors in critical locations, chip capacitors, and monolithic operational-amplifier chips, the authors show a block diagram of the entire circuit. The transfer functions of each of the stages is derived. The predicted gain peak and the shape of the measured bandpass agree well with experimental results. The computer simulation using an op-amp 'macromodel' gives results very closely resembling the measured bandpass. The dominant sources of noise in the amplifier/filter and

1000002 A7703971. B77016834  
A HYBRID INTEGRATED MONOLITHIC CRYSTAL FILTER  
OKUNO, K.; WATANABE, T.  
NIKKON ELECTRIC CO. LTD., KAWASAKI CITY, KANAGAWA, JAPAN  
US. ARMY  
PROCEEDINGS OF THE 30TH ANNUAL SYMPOSIUM ON FREQUENCY  
CONTROL 1976-1977 1976  
2-24 JUNE 1976 ATLANTIC CITY, N.J., USA  
ELECTRONIC INDUSTRIES ASSOC., WASHINGTON, D.C., USA  
THIS CONSISTS OF THIN FILM LUMPED ELEMENT CIRCUIT AND ENERGY  
TRAPPED RESONATOR IN INTEGRATED STRUCTURE ON A SUBSTRATE. A  
GENERAL DISCUSSION OF THE DESIGN AND FABRICATION IS PRESENTED  
(6 Refs.)  
Descriptors: HYBRID INTEGRATED CIRCUITS; CRYSTAL FILTERS;  
INTEGRATED CIRCUIT TECHNOLOGY; THIN FILM CIRCUITS;  
TRANSFORMERS; HYBRID INTEGRATED MONOLITHIC CRYSTAL FILTER;  
THIN FILM LUMPED ELEMENT CIRCUIT; ENERGY TRAPPED RESONATOR;  
SUBSTRATE; DESIGN; FABRICATION  
06  
Section Class Codes: A4360, B12700, B2220J, B2860.

1047-52 B77017047  
INVESTIGATION INTO FAILURES OF AL WIRES BONDED TO AU  
METALLIZATION IN MICROSUBSTRATES  
KOSOWSKY, R. J.; ROBINSON, A.  
WESTINGHOUSE RES. LABS., PITTSBURGH, PA., USA  
IEEE  
14TH ANNUAL PROCEEDINGS RELIABILITY PHYSICS 75-01 1976  
20-22 APRIL 1976 LAS VEGAS, NEV., USA  
THE MORPHOLOGY AND MICROSTRUCTURAL CHARACTERISTICS WERE  
INVESTIGATED BY SEM, ELECTRON PROBE AND AUGER SPECTROSCOPY. IT  
IS SHOWN THAT THE ULTRASONIC BONDING CREATES AN INTERACTION  
ZONE ABOUT 5  $\mu$  M DEEP. LOW BOND STRENGTH AND FAILURE AFTER  
AU 100 S. THESE IMPURITIES FORM BRITTLE INTERMETALLICS WITH AL  
AND BRITTLE, READILY REDUCIBLE, LOW MELTING GLASSES (16  
Ref.)  
Descriptors: THICK FILM CIRCUITS; METALLISATION; LEAD  
ALUMINUM ALLOYS  
Identifiers: AL WIRES; AU METALLIZATION; MICROSUBSTRATES;  
MICROSTRUCTURE; CHARACTERISTICS; SEM; ELECTRON  
PROBE; AUGER SPECTROSCOPY; ULTRASONIC BONDING; FAILURE; H/SUB  
2/; SOLDERING CYCLE; AU INKS; IMPURITIES; BRITTLE  
06  
Section Class Codes: B2220J, B2550F, B7820, B0530, B2220G.

1043-52 B77017041  
THICK FILM HYBRID CIRCUITS-WHAT MUST BE DONE TO MEET THE  
DEMAND  
WHITEHEAD, J.  
NEWMARKET TRANSISTORS LTD., NEWMARKET, ENGLAND  
ELECTRON. EQUIP. NEWS (GB) 4-5 FEB.-MARCH 1977  
ECONAN  
DISCUSSES MANUFACTURING REQUIREMENTS FOR THE EXPECTED  
INCREASE IN DEMAND. THE AUTHOR CONSIDERS AUTOMATIC EQUIPMENT  
FOR CHIP BONDING AND WIRE BONDING AND THE SUPPLY OF ACTIVE  
DEVICE AND ICS IN CHIP OR SLICE FORM  
Descriptors: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS  
; INTEGRATED CIRCUIT MANUFACTURE; MICROASSEMBLING; INTEGRATED  
CIRCUIT TECHNOLOGY  
Identifiers: MANUFACTURING REQUIREMENTS; AUTOMATIC EQUIPMENT  
; CHIP BONDING; WIRE BONDING; CHIP/SLICE ICS; HYBRID INTEGRATED  
CIRCUITS; EXPECTED INCREASED DEMAND; IC MANUFACTURE  
02  
Section Class Codes: B2220J, B2220G, B2240, B0170E, B2550

1044-50 B77017045  
GOLD ALUMINUM INTERCONNECT STABILITY ON THIN FILM HYBRID

1043641 B77017036  
DESIGNING OF THIN-FILM RESISTORS AND AUTOMATIC VALUE  
ADJUSTMENT BY THE HELP OF A COMPUTER  
HOLTHOUS, J.  
FIRIMTECH, AND MIKROTECH. (HUNGARY) VOL.15, NO.10 308-11

Various micro-engraving methods are suited to form NiCr hybrid circuits on thin-film resistors in integrated substrates. Numerous advantages of electron beam and laser techniques are, however, often counterbalanced by high initial costs. Therefore these two processes are not used widely in Hungary. Micro-engraving by electro-erosion can be well automated by a relatively simple drawing machine and a small computer. The quality of trimming performed by this technique equals, in the case of accomplished production technology, that of resistors produced by the laser technique. (5 Refs.)  
D.-C. resistors; thin-film resistors; circuit layout CAD; hybrid integrated circuits; thin-film circuits; thin-film resistors hybrid integrated circuits; NiCr; thin-film resistors; computer aided design; electroerosion microengraving methods; automated trimming  
02  
Section Class Codes: B2220E, B2120, B2220J  
Language: HUNGARIAN

## LEADS

PANOUSIS, N.T.; HALL, P.M.  
DELL LABS. INC., ALLENDALE, PA, USA  
IEEE TRANS. PARTS, HYBRIDS AND PACKAG. (USA) VOL. PHP-12,  
NO.4 2012-7 DEC. 1976 Coden: IEPHA  
External leads intended for thermocompression (TC1) bonding to Au-metallized thin-film circuits are typically Cu-based alloys plated with Au or a combination of Ni and Au. The objective of this work was an evaluation of the Ni/Au system to determine the optimum plating thicknesses for reliable IC bonding. Also investigated was the minimum Au thickness necessary for IC bonding. When the Ni diffusion barrier was omitted, four criteria were evaluated: initial bondability; bond strength after accelerated aging; susceptibility to cracking in a 90 degrees bend test; and fatigue behavior. The test vehicle was a 32-lead dual-in-line package utilizing alumina substrates metallized with Ti/Pd/Au films and Cu lead frames (CoA 102 and 110) electropolished with Ni and Au in the ranges of 0.41 μm and 0.420 μm, respectively (0-1630 and 15-700 μm, respectively) (7 Refs.)  
Descriptors: hybrid integrated circuits; thin film circuits; reliability; lead bonding; aluminum; optimum plating thicknesses; initial bondability; bond strength; bend test; thermocompression bonded external leads; Au plating thickness; fatigue behaviour; Ni plating thickness; 32 lead dill package; Au metallized thin film circuits bonding  
02

Section Class Codes: B2240, B2220, B0170N, B2220E

## THICK-FILM 3-STAGE MIC IMPATT-DIODE-AMPLIFIER ON FERRITE

GEMPF, R.; RICHMOND, W.; BRADDOCK, P.W.

PSI/E, GREAT MALVERN, ENGLAND

ELECTRON. LETT. (GB) VOL. 13, NO. 7 193-5 31 MARCH 1977

Coden: FLEAK  
A 3-stage hybrid mic gallium-arsenide IMPATT-diode amplifier is described with an output of 1.05 W at 9.2 GHz. A large-signal gain of 21 dB and a bandwidth to -3 dB greater than 1 GHz; the amplifier is stable at all input levels. The concept of an effective radius, first proposed to explain the properties of diode capacitors, has been used successfully in the circulator design. Close attention has been paid to the shielding, the uncapsulated diodes to prevent rf radiation and to incorporating resistive-loading circuits to suppress spurious out-of-band oscillations. (5 Refs.)  
Diodes: IMPATT diodes; microwave integrated circuits;  
microwave amplifiers; hybrid integrated circuits; thick film circuits  
Identifiers: ferrite; effective radius; circulator design;  
thick film 3-stage mic IMPATT diode amplifier; GaAs diode  
02  
Section Class Codes: B1350F, B2220J, B2220G, B2550H, B1220

Section Class Codes: B2240, B2220, B0170N, B2220E

Language: SPANISH

1034038 B77013295  
THE EFFECTS OF GOLD AND NICKEL PLATING THICKNESSES ON THE  
STRENGTH AND RELIABILITY OF THERMOCOMPRESSION-BONDED EXTERNAL

LEADS  
NO.4 2012-7 DEC. 1976 Coden: IEPHA  
External leads intended for thermocompression (TC1) bonding to Au-metallized thin-film circuits are typically Cu-based alloys plated with Au or a combination of Ni and Au. The objective of this work was an evaluation of the Ni/Au system to determine the optimum plating thicknesses for reliable IC bonding. Also investigated was the minimum Au thickness necessary for IC bonding. When the Ni diffusion barrier was omitted, four criteria were evaluated: initial bondability; bond strength after accelerated aging; susceptibility to cracking in a 90 degrees bend test; and fatigue behavior. The test vehicle was a 32-lead dual-in-line package utilizing alumina substrates metallized with Ti/Pd/Au films and Cu lead frames (CoA 102 and 110) electropolished with Ni and Au in the ranges of 0.41 μm and 0.420 μm, respectively (0-1630 and 15-700 μm, respectively) (7 Refs.)  
Descriptors: hybrid integrated circuits; thin film circuits; reliability; lead bonding; aluminum; optimum plating thicknesses; initial bondability; bond strength; bend test; thermocompression bonded external leads; Au plating thickness; fatigue behaviour; Ni plating thickness; 32 lead dill package; Au metallized thin film circuits bonding  
02  
Section Class Codes: B2240, B2220, B0170N, B2220E

THICK-FILM HYBRID MICROCIRCUITS

HEITHERINGTON, D.R.  
NEWMARKET TRANSISTORS LTD., NEWMARKET, ENGLAND  
MUNDEN ELECTRON. (SPAIN) NO.58 63-6 DEC. 1976 Coden: MUDCN  
Reviews the design and manufacture of thick-film hybrid microcircuits and applications in medicine, industrial and consumer products, military and space apparatus, motor vehicles and telecommunications  
Descriptors: hybrid integrated circuits; thick film circuits  
Identifiers: design; manufacture; applications; thick film circuits  
02  
Section Class Codes: B2220, B2220E  
Language: SPANISH

1034035 B77013292 MANUFACTURING PROCESS FOR HYBRID MICROCIRCUITS CONTAINING (METALLIZED) VIAS. NARUMOTO, D.; LAJDEL, A.; BLESSNER, P. BUDIX CORP., KANSAS CITY, MO, USA. 11/17/76. TRANS. PHOT., HYDRO. AND PACKAG. (USA) VOL. PHP-12, NO. 4, 323-35. DIC. 1976. COUNC. IEE/MA.

HYBRID MICROCIRCUITS DESIGNED FOR USE IN RADARS REQUIRE METALLIZED VIAS TO INTERCONNECT FRONT-SIDE TANTALUM-NITRIDE CHROMATE-GOLD THIN-FILM LINES, WITH METALLIZED BACK-SIDE CHROMATE-GOLD THIN-FILM LINES, ON 95 X 114-MICR ALUMINA SUBSTRATES. THE AUTHORS DISCUSSED PROCESS DEVELOPED FOR FABRICATING PRECISION HOLE, IN ALUMINA SUBSTRATES, METALLIZING SUBSTRATES ON BOTH SIDES, AND THIN-FILM PHOTOLITHOGRAPHING 6-MICR-THICK GOLD TO LINWIDTHS AND SPACINGS OF 127 MICR. FRONT- AND BACK-SIDE RESISTANCE MEASUREMENTS, THROUGH THE VIA, WERE USED TO DETERMINE THE SURFACE FINISH AND METALLIZATION THICKNESS, ON THE VIA WALL. HOLE FABRICATION METHODS, INVESTIGATED INCLUDED ULTRASONIC DRILLING IN ALREADY-FIRED ALUMINA AND PUNCHING OR DRILLING HOLE. IN GREEN ALUMINA, BEFORE THE FIRING, PHOTOLITHOGRAPHY TECHNIQUES WERE DEVELOPED WHICH PROFIT BOTH SIDES OF THE SUBSTRATE AND THE VIAS FROM ETCHANTS AND DELIMITATE A THIN-FILM NETWORK CONSISTENT WITH CRITICAL HYBRID-MICROELECTRONIC-CIRCUIT (HMIC) LINWIDTH TOLERANCES FOR RF CIRCUITS. (4 Refs)

DISCUSSIONS: HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS; INTEGRATED CIRCUIT TECHNOLOGY.

Identifiers: METALLIZED VIAS; ULTRASONIC DRILLING; HYBRID IC CONTAINING PRECISION HOLES; ULTRASONIC DRILLING; HYBRID IC; THIN FILM METALLIZED VIAS; THROUGH HOLE METALLISING; RF IC'S; DRY FILM PHOTOLITHOGRAPHY; MANUFACTURING PROCESS; 127 MICRON LINWIDTHS; 1. METALLISED VIA RESISTANCE MEASUREMENTS; DOUBLE SIDED ALUMINA SUBSTRATE; HOLE FABRICATION METHODS; HOLE PUNCHING; FIRED ALUMINA; GREEN ALUMINA; THIN FILM CIRCUITS

02 Section Class Codes: B2220J, H2220E

1034034 B77013291 (THIN-FILM MICROSTRIP) WIGGLY PHASE SHIFTERS AND DIRECTIONAL COUPLERS FOR RADAR-FREQUENCY HYBRID-MICROCIRCUIT APPLICATIONS TAYLOR, J. L.; PRIGEL, D. O. BUDIX CORP., KANSAS CITY, MO, USA. 11/16/76. TRANS. PARTS, HYBRIDS AND PACKAG. (USA) VOL. PHP-12, NO. 4, 317-23. DEC. 1976. COUNC. IEE/MA.

A PACKAGING TECHNIQUE WHICH MAKES USE OF A THIN-FILM MICROSTRIP WIGGLY (SAWTOOTH) CONDUCTOR-EDGE GEOMETRY BETWEEN ADJACENT CONDUCTORS HAS BEEN DEVELOPED FOR THE FABRICATION OF NONDISPERSIVE MICROFABRICATED HYBRID MICROCIRCUIT-DIRECTIONAL COUPLERS, AND PHASE SHIFTERS. THE NEW TECHNIQUE PROVIDES APPROXIMATELY A 20-FEET/ST. SPACE SAVING, AS WELL AS A SIGNIFICANT IMPROVEMENT IN CIRCUIT FABRICATION. (16 Refs)

DISCUSSIONS: MICROFABRICATED HYBRID CIRCUITS; THIN FILM CIRCUITS; STRIP LINE COUPLERS; PHASE SHIFTERS; DIRECTIONAL COUPLERS

02 Section Class Codes: B2220J, B2220E, B1350F

1034033 B77013290 IDENTIFIERS: ADJACENT CONDUCTORS; MICROWAVE ICS; MICROSTRIP; WIGGLY PHASE SHIFTERS; WIGGLY DIRECTIONAL COUPLER; IC DIRECTIONAL COUPLERS; WIGGLY CONDUCTOR EDGE GEOMETRY; 20 PER CENT SPACE SAVING; DISPERSION REDUCTION TECHNIQUES; NONDISPERSIVE PHASE SHIFTERS; NONDISPERSIVE DIRECTIONAL COUPLERS

02 Section Class Codes: B2220J, B1320, B1290, B1350F

1034033 B77013290 THIN-FILM MICROWAVE INTEGRATED CIRCUITS. ARAMATI, V. S.; BITLER, J. S.; PFAHL, A.; SHIFFLET, C. C. BELL TELEPHONE LABS, INC., NORTH ANDOVER, MA, USA. 11/16/76. TRANS. PARTS, HYBRIDS AND PACKAG. (USA) VOL. PHP-12, NO. 4, 309-16. DEC. 1976. COUNC. IEE/MA.

DISCUSSES THE USE OF THIN-FILM TECHNOLOGY FOR THE REALIZATION OF VERY COMPLEX CIRCUITS WITH PRECISION, RELIABILITY, AND ECONOMY. TWO NEW SUBSTRATE TYPES (FINE-GRAN ALUMINA AND FUSED SILICA) AND LOW-LOSS CONDUCTOR SYSTEMS THAT ARE BOTH SOLDERABLE AND THERMOCOMPRESSION (TC) BONDABLE ARE INTRODUCED. FURTHER COMPLICATIONS OVERCOME INCLUDED BILAYER PATTERNS WITH LASER-DRILLED PLATED VIA-HOLES, THE CONTROL AND MEASUREMENT OF THE ALUMINA SUBSTRATE, DIELECTRIC CONSTANT, AND THE USE OF LASER TRIMMING TO ADJUST SMALL GONE-UPS OF TANTALUM NITRIDE (TA/SUB 2/H) TERMINATION RESISTORS. LINWIDTH TOLERANCES OF CONDUCTORS SUCH AS 10-2.5 MICRUM ON FUSED SILICA AND 40R-5.0 MICRUM ON ALUMINA ARE ROUTINELY ACHIEVED. MICROWAVE INTEGRATED CIRCUITS (AN 18-GHZ OPA CONVERTER, A 1.7-GHZ AMPLIFIER, A FILTER, AND A DEMODULATOR) PREPARED BY THIS TECHNIQUE ARE ILLUSTRATED AND THEIR PERFORMANCES ARE DISCUSSED (12 Refs)

DISCUSSIONS: MICROWAVE INTEGRATED CIRCUITS; THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; INTEGRATED CIRCUIT TECHNOLOGY; PHOTOLITHOGRAPHY

02 IDENTIFIERS: MICROWAVE INTEGRATED CIRCUITS; VERY COMPLEX CIRCUITS; BILAYER PATTERNS; LASER TRIMMING; THIN FILM TECHNOLOGY; FINE GRAN ALUMINA SUBSTRATE; FUSED SILICA SUBSTRATE; LOW LOSS CONDUCTOR SYSTEMS; THERMOCOMPRESSION BONDABLE CONDUCTORS; SOLDERABLE CONDUCTORS; LASER DRILLED PLATED VIA HOLES

Section Class Codes: B2220J, B2220E, B1350F



1033890 877013118  
TANTALUM THIN-FILM RC CIRCUIT TECHNOLOGY FOR A UNIVERSAL  
ACTIVE FILTER

NURODEY, W.; RUTKIEWICZ, J.  
BELL LABS. INC., ALLENDALE, NJ, USA

NO. 4 276-B2 DEC. 1976 Coden: IEPHA  
DESCRIPTION: THE PHYSICAL LAYOUT, PROCESS SEQUENCE, AND  
COMPOSITION PROPERTIES OF A UNIVERSAL ACTIVE FILTER DESIGNED  
THE STANDARD TANTALUM ACTIVE RESONATOR (STAR). THIS  
ACTIVE-FILTER BUILDING BLOCK WAS REALIZED AS A HYBRID  
INTEGRATED CIRCUIT (MIC). SEVERAL DIFFERENT CIRCUIT  
CONFIGURATIONS ARE POSSIBLE, USING ONLY ONE SET OF PROCESS  
PHOTOMASKS, AND ONE MIC. THIS CAN BE ACCOMPLISHED BY A WIDE  
RANGE OF PRECISE RESISTOR VALUES, THROUGH THE USE OF LASER  
TRIMMING AND VARIOUS INTERCONNECTING SCHEMES FOR THE  
COMPONENTS ON THE MIC VIA THE PRINTED WIRING BOARD. THE STAR  
CIRCUIT IS COMPOSED OF NINE LASER-ADJUSTABLE TANTALUM,  
THIN-FILM RESISTORS, TWO 5100-PF TANTALUM CAPACITORS, AND ONE  
OPERATIONAL AMPLIFIER. THE SINGLE-SUBSTRATE RC PROCESS IS  
APPLICABLE TO BATCH PROCESSING, AND CAN BE  
FABRICATED ON A 16-PIN DUAL-INLINE PACKAGE (15 Ref.)  
DESCRIPTIONS: ACTIVE FILTERS; THIN FILM CIRCUITS; THIN FILM  
CAPACITORS; THIN FILM RESISTORS; HYBRID INTEGRATED CIRCUITS;  
TANTALUM; LASER BEAM APPLICATIONS;  
Laser filters; UNIVERSAL ACTIVE FILTER; PHYSICAL LAYOUT;  
PROCESS SEQUENCE; STAR; HYBRID INTEGRATED CIRCUIT; LASER  
TRIMMING; INTERCONNECTING SCHEMES; BATCH PROCESSING; PRECISION  
TUNING; STANDARD TACTIC RESONATOR; TA THIN FILM RC CIRCUIT  
TECHNOLOGY; 5100 PF TA CAPACITORS; 16 PIN DIL PACKAGE  
02

Section Class Codes: B1270E, B2220E, B2220J, B2130, B4360,  
B2170

Section Class Codes: B1220, B2220J, B2220E

1010517 A77011154, 87700642B  
THE RHEOLOGICAL CONTROL OF PASTES TO DETERMINE THEIR  
SUITABILITY FOR SERIGRAPHICAL APPLICATIONS  
DAUDRY, H.  
ELECTRON. AND MICROELECTRON. IND. (FRANCE) NO. 226 38-41  
15 OCT. 1976 Coden: ENIAS  
REVIEWS AVAILABLE DATA FOR THICK FILMS INCLUDING PAINTS.  
IT IS ESSENTIAL THAT THE VISCOSITY OF A PASTE SHOULD BE SUCH  
AS TO ENSURE ITS CLEAR TRANSIT THROUGH A SELECTED SCREEN AND  
AFTER ITS DEPOSITION ON THE SUBSTRATE, BE ABLE TO FORM A  
CONTINUOUS AND UNIFORM FILM. THE BASIS OF RHEOLOGY IS TO STUDY  
THE FLOW OR DEFORMATIONS WHICH THE PASTES, UNDER THE STRESSES  
TO WHICH THEY ARE SUBJECTED DURING A SERIGRAPHIC PROCESS,  
UNDERGO. THE SERIGRAPHIC PROCESS IS DESCRIBED AND SPECIFIC  
TERMS USED ARE DEFINED AND INDICATED ON A TYPICAL VISCOSITY  
CURVE. THE METHODS USED IN MEASURING VISCOSITY ARE DESCRIBED  
AND BLOCK SCHEMATIC IS SHOWN OF A COMPONENTS ASSEMBLY OF A  
ROTARY VISCOMETER. A SERIES OF CURVES ARE ALSO SHOWN  
ILLUSTRATING THE FLOW BEHAVIOUR OF A NUMBER OF SUBSTANCES  
UNDER SPECIFIED CONDITIONS. (4 Refs.)  
DESCRIPTIONS: THICK FILM CIRCUITS; RHEOLOGY  
Language: FRENCH

100806 877007522  
THICK-FILM CIRCUITS FOR SETTING THE FOCUS VOLTAGE IN COLOUR  
TELEVISION RECEIVERS  
THIEL, E.  
FORSCHAU (GERMANY) VOL.4B, NO.24 1049-50 19 NOV. 1976  
Coden: FUSIA2

USES EXAMPLES TO ILLUSTRATE THAT PRACTICALLY ALL THE  
THICK-FILM CIRCUITS FOR REGULATING FOCUSING CAN BE MET USING  
REQUIREMENTS FOR REGULATING FOCUSING CAN BE MET USING  
THICK-FILM TECHNIQUES (BUT AS YET NO STANDARDISATION HAS TAKEN  
PLACE). SOME OF THE EXAMPLES DESCRIBED ARE: B HV FIXED  
RESISTORS, 2 KV TRIMMER, ROD REGULATOR, AND SL HV CASCADE  
BLEEDER  
DESCRIPTIONS: THICK FILM CIRCUITS; COLOUR TELEVISION  
RECEIVERS; POWER SUPPLIES FOR APPARATUS  
IDENTIFIERS: SETTING THE FOCUS VOLTAGE; COLOUR TELEVISION  
RECEIVERS; B HV FIXED RESISTORS; 2 KV TRIMMER; ROD REGULATOR;  
SL HV CASCADE BLEEDER; THICK FILM CIRCUITS  
02  
Section Class Codes: A4660, B2220G  
Language: GERMAN

Section Class Codes: B6420D, B2220G, B1210  
Language: GERMAN

10347N2 877012001  
DIFFERENTIAL INSTRUMENTATION AMPLIFIER  
RISCHIN, J.  
ANALOG DEVICES INC., NORWOOD, MA, USA

NO. 2 9 1976 Coden:  
ANALOG DIALOGUE (USA) VOL.10, NO.2  
THE AD522 DIFFERENTIAL INSTRUMENTATION AMPLIFIER, DESIGNED  
FOR APPLICATIONS REQUIRING HIGH PRECISION UNDER  
LESS-THAN-IDEAL OPERATING CONDITIONS, MULTIPLIES THE  
DIFFERENCE BETWEEN TWO INPUT VOLTAGES BY A FIXED GAIN, FROM 1  
TO 1000, DETERMINED BY A SINGLE EXTERNAL RESISTANCE, BUILT ON  
A PRECISION THIN-FILM SUBSTRATE IN A HERMETIC DIL PACKAGE, IT  
COMBINES MODULE-LIKE PERFORMANCE WITH IC-LINE SMALL SIZE, LOW  
COST AND PINOUT SIMILAR TO THAT OF THE MONOLITHIC AD521.  
DESCRIPTIONS: DIFFERENTIAL AMPLIFIERS; HYBRID INTEGRATED  
CIRCUITS; THIN FILM CIRCUITS  
IDENTIFIERS: DIFFERENTIAL AMPLIFIER; FIXED  
GAIN; HERMETIC DIL PACKAGE; PERFORMANCE: SIZE; COST; PINOUT;  
THIN FILM HYBRID IC  
02

1007705 B77006432  
RELIABILITY OF THIN FILM CONDUCTORS AND AIR GAP CROSSOVERS  
FOR HYBRID CIRCUITS: TESTS, RESULTS AND DESIGN CRITERIA  
PIACENTINI, G. F.; MINELLI, G.  
TELETPA, VIMERCATE, ITALY  
MICROELECTRON. AND RELIAB.  
1976 Codon: NICLAS  
Abstract: THE RESULTS OF A LONG-TERM STUDY ON THE RELIABILITY  
OF THIN FILM CONDUCTORS AND CROSS-OVERS METALLISATION FOR  
HYBRID CIRCUITS. THREE FAILURE MECHANISMS ARE EXAMINED,  
ELECTROLYTIC CORROSION, HUMIDITY CORROSION AND MECHANICAL FATIGUE,  
WHICH AFFECT THE COMPLEX HYBRID CIRCUITS AS A CONSEQUENCE OF  
THE CURRENT LOAD, OF THE HUMIDITY AND THE ELECTRICAL LOAD AND  
OF THE MECHANICAL STRESSES INDUCED BY THE ENCAPSULANT. FOR THE  
HUMIDITY CORROSION A NEW GENERAL QUANTITATIVE FORMULATION IS  
PROPOSED WHICH RELATE TEMPERATURE, POLARISATION AND IN WITH  
MEDIAN TIME TO FAIL. THE AGREEMENT BETWEEN THE PROPOSED  
FORMULATION AND THE RESULTS IS VERIFIED BOTH ON UNENCAPSULATED  
AND ON ENCAPSULATED COMPONENTS AND GIVE AN ACTIVATION ENERGY  
FOR NICHIAU OR TIPHAU MATERIALS OF PHIE=53 EV. FINALLY, SOME  
CAUTELATIVE DESIGN RULES ARE PROPOSED IN ORDER TO HAVE AN  
ACCEPTABLE RELIABILITY LEVEL FROM THE DESIGN (110 RESTS)  
Description: THIN FILM CIRCUITS: HYBRID INTEGRATED CIRCUITS;  
RELIABILITY: FAILURE ANALYSIS; METALLISATION: INTEGRATED  
CIRCUIT TECHNOLOGY; DESIGN ENGINEERING  
Identifiers: THIN FILM CONDUCTORS: AIR GAP CROSSOVERS;  
HYBRID CIRCUITS; DESIGN CRITERIA; RELIABILITY: FAILURE  
MECHANISMS; ELECTROLYTIC; HUMIDITY CORROSION; MECHANICAL  
FATIGUE; ENCAPSULATED COMPONENTS; CAUTELATIVE DESIGN RULES;  
LONG TERM TESTS; RESULTS: THIN FILM CIRCUITS: GENERALISED  
FAILURE TIME EQUATIONS; MEAN TIME TO FAIL; FAILURE MODES;  
UNENCAPSULATED COMPONENTS: NICHIAU METALLISATION SYSTEM;  
TIPHAU METALLISATION SYSTEM; EXPERIMENTAL RESULTS  
02  
Section Class Codes: B2220J, B2220E, B0170N, 00170C

1007693 B77006330  
INTEGRATED VOLTAGE DIVIDERS WITH CORRELATED RESISTOR  
TOPOLOGY  
MARKSYAN, E. G.; ALEMSANYAN, R. G.  
RADOTEKHNIKA, MOSKVA (USSR) VOL.31, NO.2 99-100 FEB.  
1977 Codon: RATEAD  
Trans of: TELEKOMUN. AND RADIO ENG. PT. 2 (USA)  
NO.2 125-6 FEB. 1977 Codon: TRERBS  
Abstract: THE CORRELATION COUPLINGS BETWEEN THE  
PARAMETERS OF INTEGRATED CIRCUIT COMPONENTS ARE DISCUSSED,  
IN THE TRANSFER FACTOR OF AN INTEGRATED VOLTAGE DIVIDER  
ARE ANALYSED. VERSIONS REALISING PERFECT DIVIDERS ARE  
PRESENTED (1 Ref.)  
Descriptors: VOLTAGE DIVIDERS; THIN FILM CIRCUITS  
Identifiers: CORRELATED RESISTOR TOPOLOGY; CORRELATION  
COUPLINGS; INTEGRATED CIRCUIT COMPONENTS; TRANSFER FACTOR;  
INTEGRATED VOLTAGE DIVIDER  
02  
Section Class Codes: B1290, B2220E

1006008 B77004605  
THIN-FILM VIDEO SCANNER AND DRIVER CIRCUIT FOR SOLID-STATE  
FLAT PANEL DISPLAYS  
GREENEICH, E. W.  
WESTINGHOUSE RES. LABS., PITTSBURGH, PA, USA  
Soc. INFORMATION DISPLAY, IEEE  
1976 BIENNIAL DISPLAY CONFERENCE 16-19 1976  
12-14 OCT. 1976 NEW YORK, USA  
Abstract: A THIN-FILM SCANNER CIRCUIT WHICH GREATLY REDUCES THE NUMBER  
OF EXTERNAL LEAD CONNECTIONS TO A LARGE AREA FLAT PANEL  
DISPLAY, WHILE AT THE SAME TIME PROVIDING BOTH THE SCANNING  
(ADDRESSING) FUNCTION AND THE VIDEO DRIVER FUNCTION, HAS BEEN  
SUCCESSFULLY FABRICATED. THE CIRCUIT, WHICH CAN HANDLE BOTH TV  
(ANALOGUE) AND ALPHA-NUMERIC (DIGITAL) TYPE VIDEO, ALSO  
PERFORMS LINE STORAGE SO THAT THE INCOMING SERIAL VIDEO CAN BE  
PRESENTED TO THE DISPLAY PANEL IN LINE-AT-A-TIME FASHION 13  
Ref(s):  
Descriptors: DISPLAY DEVICES; THIN FILM CIRCUITS  
Identifiers: LARGE AREA FLAT PANEL DISPLAY; VIDEO DRIVER  
FUNCTION; LINE STORAGE; ADDRESSING FUNCTION; THIN FILM SCANNER  
CIRCUIT  
06  
Section Class Codes: B7260, B2220E

1007703 B77006429  
THICK-FILM CIRCUITS IN RADIOS AND TELEVISIONS  
KIRKIN, M.; LOOSE, H.  
FURPSCHAU (GERMANY) VOL.48, NO.24 1047-8 19 NOV. 1976  
Codon: FUSIA2  
Abstract: BRIEFLY DESCRIBES BLAUPUNKT'S USE OF THICK-FILM CIRCUITS IN  
THEIR COLOUR TV RECEIVER (COLOR FM 1001-E.G. TO FORM THE  
RESISTOR NETWORK FOR THE ULTRASONIC REMOTE CONTROL AND THE USE  
OF SUCH CIRCUITS IN CAR RADIOS (E.G. THE MAIN CIRCUITS)  
02  
Descriptors: THICK FILM CIRCUITS; RADIO RECEIVERS;  
TELEVISION RECEIVERS  
Identifiers: BLAUPUNKT; RESISTOR NETWORK; ULTRASONIC REMOTE  
CONTROL; THICK FILM CIRCUITS; RADIO RECEIVERS; TV RECEIVERS  
Section Class Codes: B2220G, 05420D

999033 877003305  
MICROWAVE INTEGRATED CIRCUIT TECHNIQUES  
DILEY, T.M.  
CENTRAL RES. LAB., GEC LTD., WEMBLEY, ENGLAND  
GR.C. J. SCI. AND TECHNOL. (GB) VOL.43, NO.1 21-31 1976  
Coden: GUSTAG  
Describes the range of technologies and details the preferred design approach utilizing thin-film/open-microstrip/hybrid techniques. Considers mic facility with regard to the needs of advanced radar and telecommunication systems (13 refs.)  
Descriptors: MICROWAVE INTEGRATED CIRCUITS; INTEGRATED CIRCUIT TECHNOLOGY; STRIP LINES; THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; RADAR EQUIPMENT; TELECOMMUNICATION EQUIPMENT  
Identifiers: ADVANCED RADAR; TELECOMMUNICATION; MICROWAVE INTEGRATED CIRCUIT TECHNOLOGY; THIN FILM CIRCUITS; OPEN MICROSPLIT; HYBRID INTEGRATED CIRCUIT  
02  
Section Class Codes: B2220J, B2220E, B6320

Section Class Codes: B2220J, B2220E, B6320

999033 877003303  
THE COUPLING OF SEMICONDUCTOR ELEMENTS TO SUBSTRATES IN HYBRID THICK-FILM MICROSTRUCTURES  
CHUDAKOW, P.; FORTUNA, E.  
ELEKTRONIKA (POLAND) VOL.17, NO.7-8 265-9 1976  
Coden: EPN1Z  
Discusses the bonding of semiconductor elements to the connecting paths in thick-film hybrid microcircuits. Low-energy methods are adopted using local junction heating and glueing. (6 refs.)  
Descriptors: INTEGRATED CIRCUIT TECHNOLOGY; HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS  
Identifiers: LOCAL JUNCTION HEATING; GLUEING; HYBRID THICK FILM INTEGRATED CIRCUITS; SEMICONDUCTOR DEVICE BONDING  
02  
Section Class Codes: B2220J, B2220E, B2240  
Language: POLISH

999033 877003301  
PRECISION LASER TRIMMING OF THICK FILM CIRCUITS IN LARGE-SCALE QUANTITY PRODUCTION  
ROTH, H.G.  
SIEMENS AG, MUNICH, GERMANY  
WADELLICH, W.  
SIN: G 902152 56 6  
1975 1975 OPTOELECTRONICS CONFERENCE PROCEEDINGS 103-4  
21-27 JUNE 1975 MUNICH, GERMANY  
I.E.E. SCI. AND TECHNOL. PRESS, CULFORD, SURREY, ENGLAND  
Trimming of thick-film circuits with lasers has proved to be one of the best methods in present-day mass production.

TRIMMINGS WITH A LASER BEAM IS A THERMAL PROCEDURE, Owing TO THE GLASS STRUCTURE OF THE RESISTOR MATERIAL ON THE ONE HAND, AND THE HIGH-ENERGY INTENSITY OF THE LASER PULSES ON THE OTHER HAND. THERE IS A TENDENCY FOR CRACKS TO DEVELOP AT THE WALLS OF THE CUTS AS A RESULT OF THE THERMAL SHOCK. THESE CRACKS ARE THE MAIN CAUSE OF SUBSEQUENT RESISTANCE DRIFT. WITH SUITABLY SELECTED LASER PARAMETERS, THE RESISTANCE DRIFT CAN BE KEPT BELOW 0.3 PERCENT. THICK-FILM RESISTORS WITH TOLERANCES OF 0.1 PERCENT CAN BE REALIZED IN MASS PRODUCTION WITH GOOD YIELDS  
Descriptors: THICK FILM CIRCUITS; INTEGRATED CIRCUIT MANUFACTURE; LASER BEAM MACHINING  
Identifiers: THICK FILM CIRCUITS; MASS PRODUCTION; GLASS STRUCTURE; CRACKS; THERMAL SHOCK; RESISTANCE DRIFT; PRECISION LASER TRIMMING; TOLERANCE: HIGH ENERGY LASER PULSE  
06  
Section Class Codes: B2220G, B4360

999029 877003300  
TRENDS IN THICK FILM MATERIALS  
MONES, A.H.; ROSENBERG, R.M.  
ELECTRONIC MATERIALS DIV., E.I. DU PONT DE NEMOURS AND CO.  
INC., WILMINGTON, DE, USA  
SOLID STATE TECHNOL. (USA) VOL.19, NO.10 47-9 OCT.  
1976 Coden: SSTEAP  
The outstanding developments are reviewed since the 1950's and current trends (1975) are projected. A table which shows the changes in physical properties and performance characteristics through three time periods is given  
Descriptors: THICK FILM CIRCUITS; INTEGRATED CIRCUIT TECHNOLOGY; REVIEWS  
Identifiers: THICK FILM MATERIALS; TRENDS; PHYSICAL PROPERTIES; CHARACTERISTICS; DEVELOPMENT SINCE 1950'S; REVIEWS  
02  
Section Class Codes: B2220G

999078 B77003298  
 SYNTHESIS AND THIN FILM IMPLEMENTATION OF DISTRIBUTED RC ACTIVE FILTERS  
 REINZ, H.W.  
 INST. FÜR NETZWERK- UND SYSTEMTHEORIE, UNIV. STUTTGART,  
 STUTTGART, GERMANY  
 PROCEEDINGS OF THE 1976 IEEE INTERNATIONAL SYMPOSIUM ON  
 CIRCUITS AND SYSTEMS 224-7 1976  
 27-29 APRIL 1976 MUNICH, GERMANY  
 IEEE NEW YORK, USA  
 ELEMENTARY TRANSFER FUNCTIONS RATIONAL IN  $z^2$  AND  $z^3$  WITH LOW PASS, HIGH PASS, AND BAND PASS CHARACTERISTICS ARE ESTABLISHED AND REALIZED BY NEW TUNABLE DISTRIBUTED RC CIRCUITS. THE CIRCUITS CONSIST OF 2 OR 3 UNIFORM AC LINES AND ONE OPERATIONAL AMPLIFIER, AND THEIR POLE-Q SENSITIVITY CAN BE MADE SMALLER THAN FOR COPLANAR LUMPED CIRCUITS. A CASCADE SYNTHESIS PROCEDURE IS DEVELOPED WHERE THE RC PRODUCTS OF THE RC-LINES MAY BE COMMENSURATE. FINALLY A TUNED EXPERIMENTAL THIN FILM FILTER WITH 6TH ORDER CHEBYSHEV CHARACTERISTICS IS DESCRIBED (9 refs.)

Descriptors: THIN FILM CIRCUITS; DISTRIBUTED PARAMETER NETWORKS; ACTIVE FILTERS; TRANSFER FUNCTIONS; PARAMETER IDENTIFICATION; TRANSFER FUNCTIONS; LOW PASS; HIGH PASS; BAND PASS; TUNABLE; DISTRIBUTED; RC LINES; OPERATIONAL AMPLIFIER; SENSITIVITY; CASCADE SYNTHESIS; THIN FILM FILTER; CHEBYSHEV CHARACTERISTICS; HC ACTIVE CIRCUITS

06  
 Section Class Codes: B2220E, B0170J, B0170N

ELECTRODES. IT IS CONCLUDED THAT THE RTV SILICONE ENCAPSULANT EFFECTIVELY PREVENTS HIGH LEAKAGE CURRENTS AND SUBSEQUENT METAL MIGRATION ON BIASED TI-PO-AU CONDUCTOR SPECIMENS EXPOSED TO A MOIST CL/SUB 2/ ENVIRONMENT (12 Refs.)

Descriptors: THIN FILM CIRCUITS; ENVIRONMENTAL CONTAMINATION; RELIABILITY IDENTIFIERS; ENVIRONMENTAL CONTAMINATED WITH CL/SUB 2/; AL/SUB 2/; O/SUB 3/ SUBSTRATES; LEAKAGE CURRENTS; BETWEEN ADJACENT CONDUCTORS; METAL MIGRATION; DENDRITIC GROWTH; BIAS HUMIDITY PERFORMANCE; TI-PO-AU THIN FILM CONDUCTORS; BOPPERCENT RELATIVE HUMIDITY ENVIRONMENT; RTV SILICONE RUBBER ENCAPSULANT; ENCAPSULATED THIN FILM CONDUCTORS; UNENCAPSULATED THIN FILM CONDUCTORS; EXPERIMENTAL RESULTS

06  
 Section Class Codes: B2220E, B0170J, B0170N

9990823 B77003293  
 MANUFACTURE OF MICROCIRCUITS IN A SMALL INDUSTRIALISED COUNTRY

LUTSCH, A.G.M.  
 ELECTRICAL ENGNG. DEPT., RAND AFRICAANS UNIV., JOHANNESBURG,

S.AFRICA  
 TRAIS, S. AFRI. INST. ELECTR. ENG. (S. AFRICA) VOL. 67, NO. 9  
 25B-73 SEPT. 1976 Code: TSAE9

REVIEWS THE RESEARCH ACTIVITIES IN THE FIELD OF MICROCIRCUITS AT THE CSIR AND VARIOUS SOUTH AFRICAN UNIVERSITIES. IT IDENTIFIES THE AIM OF A MANUFACTURING FACILITY FOR A SMALL INDUSTRIALISED COUNTRY AND DISCUSSES WHAT

HAT, WILL AND SHOULD BE DONE TO IMPLEMENT THE DESIGN AND MANUFACTURE OF MICROCIRCUITS IN SOUTH AFRICA

Descriptors: INTEGRATED CIRCUIT MANUFACTURE; THIN FILM CIRCUITS; THICK FILM CIRCUITS; MONOLITHIC INTEGRATED CIRCUITS

Identifiers: MANUFACTURING FACILITY; DESIGN; THIN FILM IC; THICK FILM IC; MONOLITHIC TECHNOLOGY; MOS; MASK MAKING PROCESS  
 02  
 Section Class Codes: B2220C, B2570

9990127 B77003297  
 BIAS-HUMIDITY PERFORMANCE OF ENCAPSULATED AND UNENCAPSULATED TI-MI-AU THIN-FILM CONDUCTORS IN AN ENVIRONMENTAL CONTAMINATED WITH CL/SUB 2/

BILL LABS., ALLENTON, PA, USA  
 1111 TRANS. PARTS, HYBRIDS AND PACKAG. (USA) VOL. PHP-12,

NO. 11 176-1H SEPT. 1976, Cudron: IEPHAA

20TH ELECTRONIC CONFERENCE CONFERENCE 26-28 APRIL 1976

SAN FRANCISCO, CALIF., USA

WITH ENCAPSULATED TI-PO-AU THIN-FILM

CONDUCTORS ON AL/SUB 2/; O/SUB 3/ SUBSTRATES WERE BIASED IN AN

ES IN GREYSC BOPPERCENT RH ENVIRONMENT CONTAMINATED WITH CL/SUB

2/;. THE ENCAPSULANT WAS AN RTV SILICONE RUBBER. DURING

EXPOSURE TO THE CORROSIVE ENVIRONMENT, LEAKAGE CURRENTS

BETWEEN ADJACENT CONDUCTORS WERE PERIODICALLY MEASURED AND

RECORDED. LEAKAGE CURRENTS FOR THE UNENCAPSULATED SPECIMENS

INCREASED WITH TIME, AND MANY WERE SHORTED APPROXIMATELY 400

M. THERE WERE NO INCREASES IN LEAKAGE CURRENTS FOR THE

SILICONE RUBBER ENCAPSULATED CONDUCTORS. AT THE END OF THE

TEST, SELECTED SPECIMENS WERE EXAMINED USING A LIGHT

MICROSCOPE AND AN SEM WITH X-RAY CAPABILITY. NO METAL

MIGRATION WAS OBSERVED ON THE ENCAPSULATED SAMPLES. THE

UNENCAPSULATED CONDUCTORS SHOWED DENDRITIC GROWTH BETWEEN THE

99957 B77002897  
 REALIZATION OF TRANSFER FUNCTIONS USING A SPECIAL  
 DISTRIBUTED RC NETWORK STRUCTURE  
 GRUNINGER, H.P.  
 LEHRSTUHL FÜR NETZWERKTHEORIE UND SCHALTUNGSTECHNIK, TECH.  
 UNIV. MÜNCHEN, MÜNCHEN, GERMANY

IEEE PROCEEDINGS OF THE 1975 IEEE INTERNATIONAL SYMPOSIUM ON  
 CIRCUITS AND SYSTEMS 232-5 1975  
 27-29 APRIL 1976 MUNICH, GERMANY  
 IEE, NEW YORK, USA

A NEW SYNTHESIS PROCEDURE IS DEVELOPED FOR DISTRIBUTED RC  
 REALIZATION OF TRANSFER FUNCTIONS WRITTEN IN THE TRANSFORMED  
 FREQUENCY VARIABLE S-PLANE SCRODITAIN. THESE PRESCRIBED  
 TRANSFER FUNCTIONS MAY BE OF ARBITRARY DEGREE AND CAN BE  
 REALIZED WITHIN A CONSTANT MULTIPLIER BY MEANS OF RECURSIVE  
 ALGORITHMS. ESSENTIAL CIRCUIT PARAMETERS ARE DETERMINED. THE  
 SYNTHESIS LEADS TO CIRCUITS CONSISTING OF A CASCADE OF BASIC  
 STRUCTURES, QUITE SUITABLE FOR REALIZATION IN THIN FILM  
 TECHNOLOGY. A SPECIAL MATHEMATICAL REPRESENTATION OF THE BASIC  
 STRUCTURE IS A FUNDAMENTAL APPROACH FOR DEVELOPING THE  
 DEDICATED PROCEDURE (E. Refs.).  
 IDENTIFIERS: TRANSFER FUNCTIONS; DISTRIBUTED PARAMETER  
 NETWORKS; ACTIVE FILTERS; THIN FILM CIRCUITS  
 IDENTIFIERS: SYNTHESIS; PROCEDURE; DISTRIBUTED RC REALIZATION  
 ; TRANSFER FUNCTIONS; TRANSFORMED FREQUENCY VARIABLE;  
 RECURSIVE ALGORITHMS; THIN FILM TECHNOLOGY; CASCADE STRUCTURES  
 0;  
 Section Class Codes: B1150F, B1270E, B2220E

Section Class Codes: B2220G, C7410D, C39502  
 Language: HUNGARIAN

992063 B77001557  
 SYNCHRONISATION CIRCUIT AND A SWEEP GENERATOR IN  
 MICROCIRCUIT CONFIGURATION FOR SMALL OSCILLOSCOPES  
 BODNAR, Z.M.; VINYAR, V.D.; GIZHA, I.M.; KURLYAK, Y.A.S.;  
 POLUSHINA, S.G.; YAREMENKO, V.I.  
 POLUPRIVODN. TEKH. I MIKROELEKTRON. (USSR) NO.24 59-66  
 1976 Content: PTNAC  
 EXAMINES THE DESIGN OF A SYNCHRONISATION CIRCUIT AND A SWEEP  
 GENERATOR EMPLOYING HYBRID THICK-FILM MICROCIRCUITS. IN A  
 SMALL-SCALE OSCILLOSCOPE WITH A BANDWIDTH OF 10 MHZ. FACTORS  
 ASSOCIATED WITH THE REALISATION OF THE SAW-TOOTH VOLTAGE  
 GENERATOR USING AN FET FEEDBACK LOOP IN MICROCIRCUIT FORM ARE  
 DISCUSSED. THE ELECTRICAL CIRCUITS, THE CONSTRUCTION AND THE  
 TECHNOLOGY OF MANUFACTURE OF THE MICROCIRCUITS ARE DESCRIBED  
 (15 Refs.)  
 IDENTIFIERS: CATHODE-RAY OSCILLOSCOPES; THICK FILM CIRCUITS;  
 HYBRID INTEGRATED CIRCUITS; TIME BASES  
 IDENTIFIERS: SMALL OSCILLOSCOPES; SYNCHRONISATION CIRCUIT;  
 SWEEP GENERATOR; BANDWIDTH OF 10 MHZ; CONSTRUCTION; TECHNOLOGY  
 OF MANUFACTURE; THICK FILM HYBRID ICs; TIME BASES; FET  
 FEEDBACK LOOP; CIRCUIT DIAGRAMS  
 02  
 Section Class Codes: B7250G, B1230G, B2220J, B2220G  
 Language: RUSSIAN

99636 B77006497, C77002197  
 A DIGITAL PROGRAM TO CONTROL DRAWING MACHINES IN PREPARING  
 MASTER PATTERNS OR THICK-FILM INTEGRATED CIRCUITS  
 RITKA, G.; ALBRECHT, M.  
 OME ELIMINTONNAL TECHNOL. TANZTER, BUDAPEST, HUNGARY  
 FIMOTECH., AND MIKROTECH., (HUNGARY) VOL. 15, NO.7 1973-8  
 JULY 1976 Content: ENGLISH  
 A PROGRAM FOR TPA-COMPUTER IS DESCRIBED, FACILITATING MASTER  
 PATHING OF THICK-FILM INTEGRATED CIRCUITS TO BE MADE BY  
 MACHINES. ON THE BASIS OF THE DESIGNED TOPOLOGY THE DRAFTER  
 COMPLETES A DATA FORM, WITH THE PREPARED DATA TAPE THE  
 INITIATIVE PROGRAM PREPARES A DOCUMENTATION LIST  
 CONTAINING ALSO THE TECHNICAL PARAMETERS, AS WELL AS  
 PUBLISHED TAPES CONTROLLING THE DIGITAL DRAWING MACHINE. THE  
 PROGRAM CONTAINS ALSO THE CALIBRATING ALGORITHM FOR THE  
 RESISTANCES WITHIN THE THICK-FILM INTEGRATED CIRCUIT (1  
 Ref.)  
 IDENTIFIERS: CIRCUIT LAYOUT CAD; THICK FILM CIRCUITS;  
 COMPUTERISED INSTRUMENTATION; DIGITAL CONTROL  
 IDENTIFIERS: DIGITAL PROGRAMS; INTERPRETATIVE PROGRAM; DIGITAL  
 DRAWING MACHINE; THICK FILM CIRCUITS; CALIBRATING PROGRAM FOR  
 RESISTANCE  
 02

99193 877001197

## A WIDEBAND SWITCHING NETWORK WITH INTEGRATED SEMICONDUCTOR CROSSPOINTS

KLEIN, H.  
FORSCHUNGSINST. ULM, AEG-TELEFUNKEN, ULM, GERMANY  
NACHRICHTENTECH. Z. (NIZZ) (GERMANY) VOL.29, NO.10  
OCT. 1965 Codens: NATEAR  
FOR SWITCHING OF ANALOGUE WIDEBAND SIGNALS SWITCHING NETWORKS WITH LARGE BANDWIDTH AND HIGH CROSSTALK ATTENUATION ARE NEEDED. HITHERTO WIDEBAND SWITCHING NETWORKS WERE REALIZED ALMOST ENTIRELY FROM ELECTROMECHANICAL CROSSPOINTS. THIS REPORT DESCRIBES THE CONSTRUCTION AND THE PROPERTIES OF A WIDEBAND SWITCHING NETWORK, WHICH CONSISTS OF SEMICONDUCTOR CROSSPOINTS. THIS IS REALIZED IN THIN FILM TECHNOLOGY AND WHICH WAS TESTED IN A SMALL EXPERIMENTAL PICTUREPHONE SYSTEM. BY COMPARING THE PROPERTIES OF THE NETWORK WITH THE CCTE-RECOMMENDATIONS FOR THE TELEVISION HYSTORICAL REFERENCE CIRCUIT IT IS SHOWN THAT THE WIDEBAND SWITCHING NETWORK IS SUITABLE FOR USE IN SMALL PICTUREPHONE SYSTEMS (6 Refs.)  
Descriptors: THIN FILM CIRCUITS; ELECTRONIC SWITCHING SYSTEMS; SWITCHING NETWORKS; SEMICONDUCTOR CROSSPOINTS; LARGE BANDWIDTH; HIGH CROSSTALK ATTENUATION; EXPERIMENTAL PICTUREPHONE SYSTEM; TELEVISION HYSTORICAL REFERENCE CIRCUIT

02 Section Class Codes: B6220B, B1290, B2220G

991294 87700504

## DEVELOPMENT AND APPLICATIONS OF THIN FILM TANTALUM HYBRID CIRCUITS

KRUGER, G.  
FUNKSCHAU (GERMANY) VOL.48, NO.20 853-6 24 SEPT. 1976  
Codens: FUSHAL2  
REQUIREMENTS FOR INTEGRATED CIRCUITS FOR SHORT PRODUCTION RUNS ARE STATED. THE TANTALUM LAYERS ARE PRODUCED ON 75 MM<sup>2</sup> MM<sup>2</sup> SUBSTRATES BY CATHODIC SPUTTERING. RESISTOR PATTERNS ARE PRODUCED BY ETCHING, AND A MINIATURE FORM OF REFLOW SOLDERING IS EMPLOYED. THE SUBSTRATE CONSISTS OF GLASS AND PHOTO-MASKING AND SCHEMATIC PRINTING ARE EMPLOYED. THE SHEET RESISTIVITY OF THE TANTALUM LAYERS (TANTALUM OXIDE-NITRIDE) IS STATED TO BE 50 TO 70 OHMS, TRACK WIDTHS ARE DOWN TO 50 MICRONS AND LENGTH:WIDTH RATIOS OF 1000 ARE STATED TO BE POSSIBLE, GIVING RESISTANCE RANGES FROM 100 OHMS TO 100 MILLION, WITH ABSOLUTE RESISTANCE ERRORS OF 10 PER CENT AND RATIO ERRORS OF 1 PER CENT. PRODUCTION PROCESSES FOR PASSIVE TANTALUM NETWORKS ARE DESCRIBED. TANTALUM HYBRID CIRCUITS FOR A PORTABLE TRANSCIEVER IN THE RANGE 80 TO 450 MHZ ARE DESCRIBED. INDUSTRIAL AND MARINE APPLICATIONS OF TANTALUM HYBRID CIRCUITS ARE MENTIONED. AND COST CONSIDERATIONS ARE ADVANCED (10 Refs.)

Descriptors: HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS  
Identifiers: CATHODIC SPUTTERING; MINIATURE FORM OF REFLOW SOLDERING; PHOTO-MASKING; SCREEN PRINTING; PORTABLE TRANSCIEVER; 80 TO 450 MHZ; COST CONSIDERATIONS; THIN FILM TA HYBRID ICs; SHORT PRODUCTION RUNS; GLASS SUBSTRATES; PRODUCTION PROCESSES; 50 TO 70 OHM SHEET RESISTIVITY; 50 MICRON TRACK WIDTH; 100 OHM TO 100 KOMH RESISTANCE RANGE; PASSIVE TA NETWORKS

99420B 87700508

## TECHNICAL ASPECTS OF MANUFACTURE OF HYBRID INTEGRATED

CIRCUITS AT MICROWAVES

VILKHOV, I.A.; GRISHCHUK, S.A.; DMITRENKO, E.I.; SENISHIN,

YAN. POLIGRAPHO, TEKH. AND MIKROLEKTRON, (USSR) NO.24 67-71

1976 Codens: PNUAC  
GENERAL TECHNICAL REQUIREMENTS FOR MICROWAVE HYBRID INTEGRATED CIRCUIT (IC) COMPONENTS ARE ESTABLISHED. THE EXISTING METHODS OF OBTAINING THE REQUIRED CONFIGURATIONS OF THE HYBRID IC COMPONENTS ARE ANALYSED. THE OPTIMUM TECHNICAL POSSIBILITIES FOR THE MANUFACTURE OF THESE COMPONENTS ARE DESCRIBED, INVOLVING DRILLING OF SUBSTRATES, VACUUM DEPOSITION OF NICKEL-CU FILM ONTO THE WORKING AND SCRATCHED SURFACES, FOLLOWED BY PHOTOLITHOGRAPHIC OPERATIONS, MECHANICAL ETCHING AND ELECTROLYTIC DEPOSITION OF METAL ONTO CONDUCTORS (6 Refs.)

Descriptors: MICROWAVE INTEGRATED CIRCUITS; HYBRID INTEGRATED CIRCUITS; VACUUM DEPOSITION; THIN FILM CIRCUITS; PHOTO-LITHOGRAPHY; NICKEL-CU COMPOUND  
Identifiers: ASPECTS OF MANUFACTURE; MICROWAVE HYBRID INTEGRATED CIRCUIT; TECHNOLOGICAL PROCESSES; DRILLING OF SUBSTRATES; VACUUM DEPOSITION OF NICKEL-CU FILM; PHOTOLITHOGRAPHIC OPERATIONS; CHEMICAL ETCHING; ELECTROLYTIC DEPOSITION

02 Section Class Codes: B2220J, B2220E

Language: RUSSIAN

02 Section Class Codes: B2220J, B1350, B0520F, B2220E

Language: GERMAN

991282 877000502  
**CARPANINI, E.** **ELECTRON (GB)** NO.103 58. 60 7 OCT. 1976 **Code:**  
**ELTICL** **THE MAIN REASONS FOR THE USE OF THIN-FILM HYBRID IC'S AND THEIR SPECIAL CHARACTERISTICS, INCLUDING SUITABILITY FOR MICROAVE IC'S, THE PERFORMANCE CAPABILITY OF LASER TRIMMED NICKEL-CHROME THIN-FILM RESISTORS IS GIVEN. THE ADVANTAGES AND DISADVANTAGES OF THIN-FILM HYBRID, THICK-FILM HYBRID, AND MONOLITHIC IC ARE COMPARED. **Identifiers:** THIN FILM CIRCUITS: HYBRID INTEGRATED CIRCUITS: THIN FILM RESISTORS: CHARACTERISTICS: THIN FILM HYBRID IC'S: THIN FILM RESISTORS: PERFORMANCE**  
**Section Class Codes:** B2220J, B2220E, B2120  
**02-06**  
**Language:** ENGLISH

991281 077000501  
**FRIEDEL, W.; POTHARSI, J.** **STANDARD ELEKTRIK LORENZ AG., STUTTGART, GERMANY** NTG10K NO.103 54 85-96 1975 **Code:**  
**TECHNOLOGIEN FÜR DIE NACHRICHTENTECHNIK. (COMMUNICATION ENGINEERING TECHNOLOGY) 1975, GERMANY**  
**A BRIEF SURVEY OF THE PRESENT STATE OF THE ART OF THIN AND THICK FILM MODULE TECHNIQUES AND HYBRID ASSEMBLIES IS PRESENTED, WITH 14 ILLUSTRATIONS. MATERIALS FOR SUBSTRATES AND DEPOSITS, MANUFACTURING TECHNOLOGIES (PHOTOCHEMICAL, VACUUM SPUTTERING, TYPICAL PHYSICAL AND ELECTRICAL PARAMETERS, TOLERANCES, STABILITY AND RELIABILITY ARE DISCUSSED, FOLLOWED BY NOTES ON APPLICATIONS (17 Refs.)**  
**Identifiers:** THIN FILM CIRCUITS: THICK FILM CIRCUITS: INTEGRATED CIRCUITS: HYBRID INTEGRATED CIRCUITS: CIRCUIT RELIABILITY  
**Section Class Codes:** B2220G, B2220E, B2220J  
**02-06**  
**Language:** GERMAN

THE ADVANTAGES, DISADVANTAGES, AND THE REASONS FOR THE LIMITED USAGE OF THICK-FILM CAPACITORS ARE DISCUSSED. THE ELECTRICAL AND ENVIRONMENTAL PROPERTIES OF A GLASS-PASSIVATED HIGH DIELECTRIC CONSTANT (MK) ( $\epsilon_r=1000$ ) CAPACITOR WHICH DOES NOT REQUIRE HERMETIC PACKAGING ARE DESCRIBED. DESIGN CRITERIA FOR ACHIEVING LOW-COST THICK-FILM CAPACITOR RESISTOR-CONDUCTOR NETWORK ARE PRESENTED. THESE INCLUDE SATISFYING MULTIPLE CIRCUIT REQUIREMENTS: USING MANY CAPACITORS, RESISTORS, AND CONDUCTORS PER CIRCUIT, OR PER PROCESSING OPERATION; USING LOW-COST MATERIALS, SEALING TECHNIQUES, AND PROCESSES; AND ACHIEVING HIGH YIELDS. AN EXAMPLE IS CITED OF A TELEVISION VARACTOR TUNER CIRCUIT ON A 2.31-0.040-IN SUBSTRATE UTILIZING 47 RESISTORS, 30 CAPACITORS, EIGHT CROSSOVERS, AND ONE GROUND PLANE IN WHICH THE SUBSTRATE ALSO SERVES AS A PRINTED CIRCUIT BOARD FOR MOUNTED DISCRETE COMPONENTS (122 Refs.)  
**Identifiers:** THICK FILM DEVICES: CAPACITORS: THICK FILM CIRCUITS: PASSIVATION  
**Section Class Codes:** B2220G, B2120  
**06**  
**Language:** ENGLISH

991278 877000498  
**CARCIA, P.F.; ROSENBERG, R.M.** **INSTRUMENTS INC., NIAGARA FALLS, NY, USA** NO.10 25-7 SEPI. 1976  
**DU PONT DE NEMOURS AND CO. INC., ELECTRONIC MATERIALS DIV., E.I. DU PONT DE NEMOURS AND CO. INC., NIAGARA FALLS, NY, USA** NO.22 VOL.22  
**ISCUFF** **CODE: ISCUFF**  
**SOURCES OF PROCESS SENSITIVITY, HIGH VOLTAGE STABILITY, AND LOW CONTACT NOISE IN HIGH RESISTIVITY THICK FILM RESISTORS ARE CONSIDERED. DESIGN CRITERIA ARE SUGGESTED FOR OPTIMIZATION OF THESE PROPERTIES. ON THE BASIS OF THESE CRITERIA, THE HIGH RESISTIVITY, HIGH VOLTAGE RESISTOR SERIES IS DEVELOPED WITH CHARACTERISTICS SUITABLE FOR TELEVISION CIRCUITS (6 Refs.)**  
**Identifiers:** THICK FILM RESISTORS: HIGH VOLTAGE STABILITY: LOW PROCESS SENSITIVITY: HIGH RESISTIVITY THICK FILM RESISTORS: HIGH VOLTAGE RESISTOR SERIES: SUITABLE FOR TELEVISION FOCUS CONTROL CIRCUITRY; SOURCES OF PROCESS SENSITIVITY: DESIGN CRITERIA  
**Section Class Codes:** B2220G, B2120  
**02**  
**Language:** ENGLISH

991280 877000500  
**BATTSCHUN, W.R.** **ZILM RADIO CORP., ELM GROVE VILLAGE, IL, USA** NO.13 104-201 SEPI. 1976  
**111 E. TRANS. PARTS, HYBRIDS AND PACKAG. (USA)** NO.13 104-201 SEPI. 1976  
**VOL. PHP-12.** **CODE: ZILM**  
**21st ELECTRONIC COMPONENTS CONFERENCE** **26-28 APRIL 1976**  
**SAN FRANCISCO, CALIF., USA**

991277 B77000495  
AN INEXPENSIVE THICK FILM FURNACE  
BEGAKIS, N.

SCHOOL OF ELECTRONIC ENGG., SOUTH AUSTRALIAN INST. OF  
TECHNOL., AUSTRALIA  
ELECTRODASON, SCI. AND TECHNOL. (GB) VOL. 3, NO. 2 113-15  
SEPT. 1976 Coden: ECTCS  
THE CENTRE IS THE FURNACE FOR FIRING THE THICK FILM PASTES.  
THERE ARE USUALLY LARGE AND EXPENSIVE BELT FURNACES. THIS  
ARTICLE DISCUSSES THE DESIGN AND MANUFACTURE OF AN INEXPENSIVE  
THREE ZONE BELT FURNACE OF MODERATE SIZE, WHICH ANY REASONABLY  
WELL EQUIPPED COLLEGE, UNIVERSITY OR SMALL MANUFACTURER COULD  
ASSEMBLE

Descriptors: INTEGRATED CIRCUIT TECHNOLOGY; THICK FILM  
CIRCUITS  
Identifiers: THICK FILM FURNACE; FIRING; THICK FILM PASTES;  
THREE ZONE BELT FURNACE  
02  
Section Class Codes: B2220G

991275 B77000494  
EXTENDING THE USE OF THICK FILM  
BARNHILL, P.G.  
ELECTRON (GB) NO.103 56. 58 7 OCT. 1976 Coden:  
ELTECH  
DISCUSSES RESISTOR NETWORKS WITH LOW TEMPERATURE  
COEFFICIENT, HIGH VALUE/HIGH VOLTAGE RESISTORS, MICROWAVE  
CIRCUITS, AND THICK FILM TRANSDUCERS. (4 Refs)  
Drivers: THICK FILM CIRCUITS; THICK FILM RESISTORS;  
Reviewers:  
Identifiers: RESISTOR NETWORKS; LOW TEMPERATURE COEFFICIENT;  
HIGH VALUES/HIGH VOLTAGE RESISTORS; MICROWAVE CIRCUITS;  
TRANSDUCERS; REVIEWS; THICK FILM RESISTORS  
0:  
Section Class Codes: B2220G, B2120

991276 B77000499  
AN INSTRUMENT FOR TESTING PARAMETER DEVIATIONS OF  
MICROELECTRONIC DEVICES  
GRISHENOK, A.G.; NIKHITIN, A.G.  
POLUPRODNO, TEKH. AND MIKROELEKTRON. (USSR) NO.24 98-8  
1976 Coden: PTMUC  
Describes circuit details and the operation of a tester, for  
use in investigations of failures of microelectronic devices,  
and measurement of deviations of parameters, such as  
resistance, capacitance and bias current of capacitors, as  
well as conductance of switching routes and junctions, as a  
function of temperature, pressure and humidity, and other  
factors. The input signal range of the tester is -5 V to +5 V,  
input sensitivity 4.5 MV, maximum operating frequency of the  
comparators 20 MHz, input frequency range 0 to 10 MHz, and  
current consumption of 150 mA. In conjunction with electronic  
counters, this instrument can also be used for investigations  
of micro-breakdowns of thin-film capacitors (4 Refs)

Descriptors: INTEGRATED CIRCUIT TESTING; TEST EQUIPMENT;

THIN FILM CIRCUITS; THIN FILM CAPACITORS

Identifiers: INSTRUMENT; TESTING; PARAMETER DEVIATIONS;

CAPACITANCE; BIAS CURRENT OF CAPACITORS; CONDUCTANCE OF

SWITCHING ROUTES; FUNCTION OF TEMPERATURE; COMPARATORS; INPUT

FREQUENCY RANGE 0 TO 10 MHz; CURRENT CONSUMPTION OF 150 MA; 1C

TESTER; + OR -5 V INPUT SIGNAL RANGE; FAILURE ANALYSIS; 20 MHz

MAXIMUM FREQUENCY; FUNCTION OF PRESSURE; FUNCTION OF HUMIDITY;

CIRCUIT DIAGRAM; MICROBREAKDOWNS OF THIN FILM CAPACITORS; 5 MV

INPUT SENSITIVITY; THIN FILM CAPACITORS TESTING

02

Section Class Codes: B2220, B2570, B0170E, B7210X

Language: RUSSIAN

991272 B77000491  
FEASIBILITY OF PRODUCING THIN-FILM INDUCTIVE COILS AT  
MICROWAVES  
GRISHENOK, S.A.; DMITRIEV, N.A.;  
FABRIKANT, B.A. NO.24 71-9  
1977 Coden: PTMUC  
POLUPRODNO, TEKH. AND MIKROELEKTRON. (USSR)

Formulas and nomograms are derived for the design of  
thin-film inductive coils. The relationship between the  
geometry and the electrical parameters of thin-film inductive  
coils is established, and the results of the analysis are used  
to arrive at the optimum configuration of the coils. Thin-film  
coils with inductances between 0.1 and 10 mH, and Q-values  
from 50 to 200 in the range 20-50 MHz, are obtained by vacuum  
deposition of NiCr-Cu onto substrates, using photoresist masks

## 991204 877000417 ELECTROLESS PLATING-ITS APPLICATIONS IN RESISTOR TECHNOLOGY

DARDEN, J.  
MELVIN ELECTRIC LTD., BEDFORD, ENGLAND  
ELECTROPLATING, SCI. AND TECHNOL. (GB) VOL.3, NO.2 103-11  
SEPT. 1976. Coden: ECSTC  
The applications of electroless nickel as a readily soluble, completely ohmic contact for thin oxide resistors is described. Copper oxide layers produced from oxidized electroless copper are shown to improve the thermal stability of thin oxide resistors. A range of electroless high precision metal film resistors from a fraction of an ohm to 100 kohm per square and from a few millimetres in length to over 1 metre is shown to be feasible. This technology has been applied to the manufacture of thin film circuits. The outstanding thermal stability of the electroless nickel-ubon films and their temperature coefficient of resistance indicates a potential application in the field of temperature sensors. The ability to produce 'weightless' films on mylar sheet at 10 g/dm<sup>2</sup> per square is considered to be a solution to the charge distribution requirement for electrostatic loudspeakers. (Ref.)  
Descriptors: THIN FILM RESISTORS; INTEGRATED CIRCUIT TECHNOLOGY; RESISTOR TECHNOLOGY; ELECTROLESS HIGH PRECISION METAL FILM RESISTORS; THIN FILM CIRCUITS; THERMAL STABILITY; TEMPERATURE COEFFICIENT OF RESISTANCE; TEMPERATURE SENSORS; ELECTROSTATIC LOUDSPEAKERS; ELECTROLESS PLATING; SHO/SUB 2/02

Section Class Codes: B2120, B2220E

## Section Class Codes: B1350F, B2220J, B6420D, B2220E, B6250

Language: RUSSIAN

991178 877000390 MILLIMETER-WAVE THIN-FILM DOWNCONVERTER  
SHELL, W. W., JR.; SCHNEIDER, M. V.  
BELL LABS., MURRAY, NJ, USA  
IEEE TRANS. MICROWAVE THEORY AND TECH. (USA) VOL. MTT-24,  
NO. 11, NOV. 1976. Coden: JETMAB  
A 60-GHz HYBRID INTEGRATED DOWNCONVERTER INTENDED FOR USE IN A MILLIMETER-WAVE RADIO RELAY EXPERIMENT HAS BEEN DESIGNED AND TESTED. THE CONVERTER CONSISTS OF A STRIP TRANSMISSION LINE CIRCUIT AND TWO BEAD-LEADED SCHOTTKY-BARRIER DIODES WHICH ARE PUMPED AT A SUBHARMONIC OF THE CONVENTIONAL LOCAL OSCILLATOR FREQUENCY. THE CONVERSION LOSS OF THE CIRCUIT IS 6.3 dB AND THE TOTAL SINGLE-SIDEBAND NOISE FIGURE INCLUDING THE NOISE CONTRIBUTION FROM THE IF AMPLIFIER IS 9.1 dB. THE CIRCUIT LOOKS ATTRACTIVE FOR MILLIMETER-WAVE COMMUNICATION SYSTEMS APPLICATION UP TO 100 GHz (6 Refs)  
Descriptors: HYBRID INTEGRATED CIRCUITS; MICROWAVE INTEGRATED CIRCUITS; THIN FILM CIRCUITS; SOLID-STATE MICROWAVE CIRCUITS; BEAM-LEAD DEVICES; SCHOTTKY-BARRIER DIODES; PARAMETRIC DEVICES  
Identifiers: STRIP TRANSMISSION LINE CIRCUIT; MILLIMETRE WAVE THIN FILM DOWNCONVERTER; HYBRID INTEGRATED CIRCUITS; BEAM LEADED SCHOTTKY BARRIER DIODES; 60 GHZ 02

Section Class Codes: B1350F, B2220J, B2560H, B2220E

## 991174 877000386 A DISTRIBUTED-STRUCTURE THIN-FILM MICROWAVE ATTENUATOR

POLUSHINA, S. G.; MIKHAILOVA, G. F.  
POLUPRUDN. TEKH. I MIAKROELEKTRON. (USSR) NO. 24 36-40  
1976. Coden: PTMIA  
WITH THE AID OF DISTRIBUTED STRUCTURES, ARE EXAMINED AND REFINED FOR THE CASE OF MICROWAVE THIN-FILM ATTENUATORS, THE EXISTING METHODS OF PRACTICAL DESIGNS OF POWER DIVIDERS, THE APPLICATION OF THE DERIVED EXPRESSIONS, AND OF A GRAPH SHOWING THE DIVISION FACTOR VERSUS SIZE OF THE ATTENUATOR, ARE ILLUSTRATED BY AN EXAMPLE (6 Refs)  
Descriptors: THIN FILM CIRCUITS; ATTENATORS; MICROWAVE INTEGRATED CIRCUITS  
Identifiers: POWER DIVIDERS; DISTRIBUTED STRUCTURES; DEFINED EXPRESSIONS; DIVISION FACTOR; THIN FILM MICROWAVE ATTENUATORS; 02  
02

02

Section Class Codes: B1350, B2220E, B1270, B2220J  
Language: RUSSIAN

**9991122 87000342** A FREQUENCY MULTIPLIER IN MICROCIRCUIT CONFIGURATION  
 BEN, K.O., S.1.: VINYAR, V.D.; YAREMENKO, V.I.  
 1975: Gudon, P.M., PUMAC  
 VIL'KHOVODOV, TERN, and MIKOEL ELEKTRON, (USSR) NO. 24 29-30  
 155: The results are reported of the design and evaluation of a  
 small-size frequency multiplier. The passive parts of which  
 are manufactured by methods of thin-film technology, with  
 inductances and capacitors mounted on the substrate. The  
 multiplication factor is 15 times, and the output signal is 20  
 times. In conditions when the input signal varies between 600 and  
 1520 mV, the spurious harmonics are suppressed by 40 dB.  
 Designers: frequency multipliers; thin film circuits  
 Designers: frequency multipliers; thin film capacitors; thin film inductors  
 Frequency: 15: 20 mV output signal; + or - 50 degree C operation  
 02: thin film capacitors; thin film inductors  
 Section Class Codes: B12908, B2220E  
 Language: Russian

0991120 B77000322 TECHNOLOGY OF MANUFACTURE OF THIN-FILM VOLTAGE DIVIDERS  
 V.LASOVA. V.V.: GRISHCHUK, S.A.: SENISHIN, Y.A.M.: FABRIKANT  
 POLUPRUDOV, TEKH. AND MIKROELEKTRON. (USSR) NO. 24 83-1  
 METHODS OF MANUFACTURE OF HIGH-STABILITY PRECISION VOLTAGE DIVIDERS ARE DESCRIBED. SEVERAL POSSIBLE PROCEDURES FOR PRODUCING SUCH DIVIDERS ARE EXAMINED, AND THE MOST SUITABLE IS RECOMMENDED. NICHROME WAS USED AS THE RESISTANCE MATERIAL FOR THE DIVIDERS. THE TRIMMING OF THE DIVIDERS WAS ACCOMPLISHED BY ANODIC ETCHING, WHICH UNABLED THE INPUT AND OUTPUT RESISTANCES OF THE DIVIDERS TO BE ADJUSTED WITH AN ACCURACY OF +0.1-0.5 PERCENT, AND THE DIVISION FACTOR WITH AN ACCURACY OF 0.01-0.5 PERCENT (7 RELS).  
 Dividers: THIN FILM CIRCUITS: THIN FILM RESISTORS  
 VOLTAGE DIVIDERS: THIN FILM VOLTAGE DIVIDERS: METHODS OF MANUFACTURE: NI-CH THIN FILM: TRIMMING BY ANODIC ETCHING: HIGH STABILITY PRECISION: ACCURACY OF + OR - PERCENT  
 Section Class Codes: B1290-22220E, B1210  
 02  
 02  
 Leningrad, Russia

991076 077000239  
 A FREQUENCY SYNTHESIZER USING THIN-FILM COMPONENTS  
 VINYAR, V.D.; VENMA, YA.M.; KOTLYAROV, A.V.  
 POLYPROVOD, TEKH. AND MIKROELEKTRON. (USSR) NO.24 31-3  
 1976 Coden: PTHAC  
 Describes a high-frequency synthesizer, designed by methods of thin-film technology. In particular, the passive parts of the regenerative amplifier, the multiplier and the mixer are manufactured on separate devitrified-glass substrates, using CR-CU-NI thin-film. Followed by photolithographic processes, the synthesizer performs 7/3 times frequency conversion, producing an output of 0.3 v into a 50 ohm load. For an input signal of 0.2 v, the level of spurious signals in the spectrum is  $\approx$  30 dB. Circuit and constructional details of the synthesizer are presented (6 refs).  
 Descriptors: FREQUENCY SYNTHESIZERS; THIN FILM CIRCUITS  
 Identifiers: FREQUENCY SYNTHESIZER; 7/3 TIMES FREQUENCY  
 CONVERSION; CONSTRUCTIONAL DETAILS; THIN FILM CIRCUITS.

CHARACTERISTICS; HF SYNTHESIZER; CIRCUIT DIAGRAM  
02 Section Class Codes: B1230, B2220E  
Language: RUSSIAN  
COUNTRY: CONVENTIONAL  
CIRCUITS, HF, FM

987607 B7546571, C7631008  
 COMPUTER DESIGNED MULTILAYER HYBRID SUBSTRATE USING THICK FILM TECHNOLOGY  
 WALDOGEL, CH.W.  
 WISTING DEFENSE AND ELECTRONIC SYSTEMS CENTER, BALTIMORE,  
 MD, U.S.A.  
 ELECTRONIC INDUSTRIES ASSOC., FRANCE, ET AL.  
 INTERNATIONAL CONFERENCE ON MANUFACTURING AND PACKAGING  
 TECHNOLOGIES FOR HYBRID CIRCUITS 203-8 1976  
 7-11 APRIL 1976 PARIS, FRANCE  
 ELECTRONIC INDUSTRIES ASSOC., FRANCE, PARIS, FRANCE  
 STATE OF THE ART SYSTEM DESIGNS REQUIRE LARGER, MORE DENSELY POPULATED, THERMALLY STABLE, MULTILAYER HYBRID SUBSTRATES. INTEGRATED LOGIC DEVICES ODECTATE THE NEED FOR NARROWER LITTLE WIDENS AND BETTER SCREENING TECHNIQUES, INCREASING MATERIAL AND LABOR COSTS, AS WELL AS COMPONENT SHOULDERES. ARE ALSO MAJOR CONSIDERATIONS IN THE EFFICIENT DESIGN OF COMPLEX SUBSTRATES. PRESENTED HEREIN ARE THE MATERIALS, SCHLEINING TECHNIQUES, AND PROCESS STEPS REQUIRED TO FABRICATE A DENSELY POPULATED HYBRID USING COMPUTER GENERATED NEUTRONIC. THE SUBSTRATE DISCUSSION IN THIS PAPER IS PRODUCED FOR THE RENAULT AIR DEVELOPMENT CENTER; THE PROTOTYPE UNITS HAVE BEEN CROSSED AND A PRODUCTION LOT IS BEING FABRICATED. THE HYBRID CONSISTS OF ONE 32 LAYERED LAYER BERYLLIUM SUBSTRATE MOULDED IN 2.5ECONDS. \*2.55 CENTS, \*165 SECONDS, TTL CHIPS, OPERATES AT A FREQUENCY OF 10 MHZ, AND DISBURSES 10 WATTS.  
 DESIGNERS: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS; INTEGRATED CIRCUIT PRODUCTION; COMPUTER-AIDED CIRCUIT DESIGN  
 ELECTRONICS APPLICATIONS OF COMPUTERS  
 10-11 APRIL 1976 PARIS, FRANCE, ET AL.  
 ELECTRONIC INDUSTRIES ASSOC., FRANCE, ET AL.  
 COMPUTER GENERATED NETWORK: PROTOTYPE UNITS; PRODUCTION; COMPUTER GENERATED DESIGN  
 05  
 Section Class Codes: B2540, B2522, B1269, C0842  
 Unified Class Codes: SMEAAB, SMCAX, ADGMAE, WMEAQ

OFTEN THE CAUSE OF DEFECTS IN SEMICONDUCTORS. THIS TECHNOLOGY AFFORDS ADVANTAGES IN THE REALIZATION OF THE HYBRID INTEGRATED CIRCUIT AUTOMATIC ASSEMBLY. IN THIS WAY, TWO MAIN CHOICES HAVE BEEN DEVELOPED BY RTC: (1) THE REALIZATION OF SOLDER BUMPS ON THE WAFER IS MADE IN THE HYBRID PRODUCTION LINE ACCORDING TO A PROCESS WHICH HAS SHOWN EVIDENCE OF ITS QUALITY WITHIN THE SUBSTRATE; (2) AN AUTOMATIC COMPONENTS ASSEMBLY LINE, ON THE CRYSTAL WITH SOLDER BUMP CAN BE TREATED IN THE SAME WAY AS THE COMPONENTS USED IN HYBRID TECHNOLOGY. ALL THE ASSEMBLING POSTS ARE CONTROLLED BY A COMPUTER. THE REPORT ON THE RESULTS OBTAINED SHOWS THE NUMEROUS APPLICATIONS OFFERED BY THIS SOLUTION  
 DESIGNERS: HYBRID INTEGRATED CIRCUITS; INTEGRATED CIRCUITS; PRODUCTION; THIN FILM CIRCUITS; PRODUCTION CONTROL; CONTROL ENGINEERING; APPLICATIONS OF COMPUTERS; ELECTRONICS  
 IDENTIFIERS: MANUFACTURING MECHANIZATION; HYBRID INTEGRATED CIRCUIT; THIN FILM PRODUCTS; QUALITY; ASSEMBLING; COMPUTER ASSEMBLY; PRODUCTION LINE; COMPUTER  
 06  
 Section Class Codes: B2540, B2522, B1269, C0842, CBB42,  
 C0846  
 Unified Class Codes: SMEAAB, SMEAAB, ADGMAE, WMEAQ,  
 WMEAQ  
 LANGUAGE: FRENCH

983032 B7649522  
 THE MICROCIRCUIT PACEMAKER SPACE AGE SPIN-OFF TO ACHIEVE RELIABILITY AND LONG LIFE  
 ADAMS, T.P.; FASANO, M.D., JR.  
 IEEE  
 PROCEEDINGS OF THE 1975 ANNUAL RELIABILITY AND MINIATURIZATION SYMPOSIUM 360-5 1975  
 20-30 JAN. 1975 WASHINGTON, D.C., USA  
 IEEE  
 THE PAPER SPECIFICALLY ADDRESSES THE IMPORTANCE OF MINIATURIZATION AND HIGH RELIABILITY TO THE SUCCESS OF PACEMAKER OPERATION. THE GENERAL THEORY OF OPERATION, COMPARISONS OF DISCRETE DEVICES AND HYBRID MICROCIRCUITS, DESIGN CONCEPTS, DESCRIPTION OF CONFIGURATIONS AND CIRCUITRY, PROCUREMENT POLICIES AND PRINCIPLES, PROCESSES UTILIZED, ASSEMBLY AND INSPECTION PROCEDURES AND TESTING PHILOSOPHIES  
 DESIGNERS: PACEMAKERS; HYBRID INTEGRATED CIRCUITS; CIRCUIT RELIABILITY  
 IDENTIFIERS: MINIATURIZATION; RELIABILITY; PACEMAKER; DISCRETE DEVICES; HYBRID MICROCIRCUITS; DESIGN CONCEPTS; PROCUREMENT POLICIES; ASSEMBLY; INSPECTION PROCEDURES; TESTING PHILOSOPHIES  
 06  
 Section Class Codes: B4660, B1263, B2540  
 Unified Class Codes: ZRMCAJ, ADGDA, SMEAB

981573 B7646577 ION MICROPROBE; AUGER; ELECTRON SPECTROSCOPY; ENVIRONMENTAL TESTS; AU-AG BONDS  
06  
Section Class Codes: B2240  
Unified Class Codes: SMEAAB

13TH ANNUAL PROCEEDINGS OF RELIABILITY PHYSICS SYMPOSIUM  
230-41 1-3 April 1976 LAS VEGAS, NEV., USA

IEEE NEW YORK, USA  
A REVIEW OF RESISTOR SYSTEMS, AND THE PROCESSES USED TO DEPOSIT AND DELINATE THEM, IS GIVEN. EFFECTS OF MECHANICAL, THERMAL, CHEMICAL AND ELECTRICAL STRESSES ARE DISCUSSED AS THEY RELATE TO ACCURACY AND STABILITY. FAILURE MECHANISMS ARE REVIEWED, TRACING TECHNIQUES ARE EXPLAINED AND DESIGN LIMITS FOR THE VARIOUS SYSTEMS DISCUSSED. PARAMETERS OF INTEREST SUCH AS FREQUENCY RESPONSE, TEMPERATURE COEFFICIENT, VOLTAGE COEFFICIENT AND NOISE, ARE COMPARED FOR THE VARIOUS SYSTEMS. FINALLY, QUALITY CONTROL AND SCREENING TECHNIQUES ARE DISCUSSED AS THEY RELATE TO FAILURE MECHANISMS AND PACKAGE QUALITY AND RELIABILITY CONTROL. (B Refs.)  
Descriptor's: HYBRID INTEGRATED CIRCUITS; THIN FILM RESISTORS; THICK FILM RESISTORS; PACKAGING; RELIABILITY  
Identifiers: FILM RESISTORS; HYBRID MICROCIRCUITS; DESIGN LIMITS; FREQUENCY RESPONSE; TEMPERATURE COEFFICIENT; VOLTAGE COEFFICIENT; NOISE; QUALITY CONTROL; SCREENING TECHNIQUES; FAILURE MECHANISMS; PACKAGE QUALITY; RELIABILITY; TRIMMING TECHNIQUES; PACKAGES  
06  
Section Class Codes: B2540, B1266, B1763  
Unified Class Codes: SMEAAB, ADGHAH, ADGMAE

981569 B7646572 A THICK FILM HYBRID POCKET MULTIMETER  
KCSIS, A. UNIV. DES SCI. APPLIQUES, UNIV. DE SHERBROOKE, SHERBROOKE, QUEBEC, CANADA  
ELECTRONIC INDUSTRIES ASSOC. FRANCE, ET AL.  
INTERNATIONAL CONFERENCE ON MANUFACTURING AND PACKAGING TECHNIQUES FOR HYBRID CIRCUITS, 209-17 1976  
7-8 April 1976 PARIS, FRANCE  
ELECTRONIC INDUSTRIES ASSOC. FRANCE, PARIS, FRANCE  
THE DESIGN AND REALIZATION OF A POCKET MULTIMETER BY UNDERGRADUATE STUDENTS IS DESCRIBED. THE FABRICATION TECHNIQUE IS DESCRIBED WITH SUFFICIENT LENGTH. THE AUTHOR UNDERLINES THE KIND OF CHALLENGE UNIVERSITIES ARE UP TO WITH REGARD TO MICROLELECTRONICS.  
Descriptor's: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS  
Identifiers: INTEGRATED CIRCUIT PRODUCTION; MEASUREMENT SYSTEMS  
Undergraduate Students; REALIZATION; POCKET MULTIMETER;  
CS: THICK FILM HYBRID CIRCUIT  
06  
Section Class Codes: B2240, B2522, B4270, B1269  
Unified Class Codes: SMEAAB, SMCCAX, BECRAX, ADGMAE

981571 B7646575 SUSCEPTIBILITY OF MICROWELDS IN HYBRID MICROCIRCUITS TO CORROSION, DEGRADATION  
JILLION, J.L.  
SANTA FE, ALBUQUERQUE, NM, USA  
IEEE  
13TH ANNUAL PROCEEDINGS OF RELIABILITY PHYSICS SYMPOSIUM  
70-9 1975

1-3 April 1976 LAS VEGAS, NEV., USA  
IEEE NEW YORK, USA  
ANALYSIS OF BROKEN ULTRASONIC AL-AG BONDS INVOLVING SEM EMISSION MICROPROBE, ION MICROPROBE, AND AUGER ELECTRON SPECTROSCOPY INDICATED THAT FAILURE WAS DUE TO CORROSION. SUBSEQUENT ENVIRONMENTAL TESTS DEMONSTRATED THAT AL-AG BONDS ARE HIGHLY SUSCEPTIBLE TO CORROSION, BUT AL-AU AND AU-AL BONDS ARE LESS SO. NO EVIDENCE OF CORROSION OF AU-AG BONDS WAS FOUND (5 Refs.)

Descriptor's: HYBRID INTEGRATED CIRCUITS; WELDING; ULTRASONIC APPLICATIONS; CORROSION; ENVIRONMENTAL TESTING; INTEGRATED CIRCUIT TESTING  
Identifiers: MICROWELDS; HYBRID MICROCIRCUITS; CORROSION DEGRADATION; ULTRASONIC AL-AG BONDS; SEM EMISSION MICROPROBE;  
06

981569 B7646570 HYBRID THICK FILM CIRCUIT TECHNOLOGY USE FOR AIRBORNE EQUIPMENT

SIMOGLARD, P.; MINAULT, M.

EDF, SAINT-CLOUD, FRANCE

ELECTRONIC INDUSTRIES ASSOC. FRANCE, ET AL.

INTERNATIONAL CONFERENCE ON MANUFACTURING AND PACKAGING

TECHNIQUES FOR HYBRID CIRCUITS 191-201

7-8 APRIL 1976 PARIS, FRANCE

PHOTOCHEM. AND MATERIALS WHICH ARE USED, SUBSTRATES,

CONDUCTIVE AND RESISTIVE LAYERS; MULTILAYERS PROCESS, ETC. ARE

BRIEFLY DESCRIBED. EXAMPLES OF DESIGNS IN THE FIELD OF LOGIC

CIRCUIT MODULES USING MULTILAYERS PROCESSES ARE SHOWN. THE

ADVANTAGES AND LIMITS OF THE THICK FILM TECHNOLOGY TOWARDS

VOLUME, RELIABILITY AND COST CRITERIA ARE ANALYSED

DISCUSSIONS: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS

INTEGRATED CIRCUITS; CIRCUIT RELIABILITY;

PRODUCTION;

EQUIPMENT: SUBSTRATES; RESISTIVE

LAYERS; MULTILAYERS PROCESS; DESIGNS; LOGIC CIRCUIT MODULES;

HYBRID THICK FILM CIRCUITS; CONDUCTIVE LAYERS; COST;

SIZE;

SECTION CODES: B2540, B2522, B1263, B1269

UNIFIED CLASS CODES: SMEAB, SMCCAX, ADDAA, AGDAA

LANGUAGE: FRENCH

Language: FRENCH

981565 B7646567 ORGANIZATION OF HYBRID THICK FILM MANUFACTURING FOR DIVERSIFIED MARKET

DELLI ACCIA, R. J. FORLANI, F.

DIV. ELETTRONICA FILM, MAGNETI MARELLI, PAVIA, ITALY

ELECTRONIC INDUSTRIES ASSOC. FRANCE, ET AL.

INTERNATIONAL CONFERENCE ON MANUFACTURING AND PACKAGING

TECHNIQUES FOR HYBRID CIRCUITS 163-72

7-8 APRIL 1976 PARIS, FRANCE

ELECTRONIC INDUSTRIES ASSOC. FRANCE, PARIS, FRANCE

A BRIEF DESCRIPTION OF THE STRUCTURE OF THE HYBRID CIRCUIT

MARKET IS GIVEN AND AN ATTEMPT IS MADE TO GIVE A MATHEMATICAL

OUTLINE CORRELATING THIS MARKET STRUCTURE AND HYBRID CIRCUIT

MANUFACTURE. IN ORDER TO OPTIMIZE IT, A VERY FLEXIBLE

ORGANIZATION BASED ON THE ACTUAL STRUCTURE OF THE MARKET IS

THEN DESCRIBED. SUCH A FLEXIBILITY IS ACHIEVED, AMONG OTHER

THINGS, BY KEEPING THE PRODUCTION RESPONSIBILITY OF SMALL

SERIES UNDER THE DESIGN AND DEVELOPMENT GROUP AND BY

TRANSFERRING UNDER PRODUCTION RESPONSIBILITY MEDIUM-LARGE

VOLUME PRODUCTS ONLY

DESCRIPTIONS: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS

INTEGRATED CIRCUIT PRODUCTION

HYBRID CIRCUIT PRODUCTION; ORGANISATION

06

981566 B7646568 HYBRID CIRCUIT OVERTAKING FEATURES

BI-SAMAT, M.

DRPF, U.C.H. THOMSON, C.S.F., ORSAY, FRANCE

ELECTRONIC INDUSTRIES ASSOC. FRANCE, ET AL.

INTERNATIONAL CONFERENCE ON MANUFACTURING AND PACKAGING

TECHNIQUES FOR HYBRID CIRCUITS 173-80

7-8 APRIL 1976 PARIS, FRANCE

ELECTRONIC INDUSTRIES ASSOC. FRANCE, PARIS, FRANCE

SIZES, AND TECHNICAL ADVANTAGES. THEY ARE ILLUSTRATED BY THREE

EXAMPLES. THE THICK FILM MULTILAYERS, ACTIVE FILTERS, ACTIVE

MONOLITHIC CHIPS ALLOW THE REALIZATION OF STANDARD

COMPLEX MICROPROCESSORS, MADE FROM HIGHLY MINIATURIZED THIN

FILM CIRCUITS. THE OSCILLATORS HAVE STABLE CHARACTERISTICS AT

HIGH FREQUENCY AND GOOD REPRODUCIBILITY. THE HYBRID CIRCUITS

TECHNOLOGY BRINGS REALLY NEW SOLUTIONS FOR ACTIVE FILTERS

MANUFACTURING

DESCRIPTIONS: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS

INTEGRATORS; HYBRID CIRCUITS; ACTIVE FILTERS; MICROPROCESSORS;

ACTIVE FILTERS; MANUFACTURING; HIGH FREQUENCY OSCILLATORS;

06

SECTION CLASS CODES: B2540, B2522, B1269

UNIFIED CLASS CODES: SMEAB, SMCCAX, AGDAA

981564 B7646566  
 THE APPLICATION OF IMPROVED THICK FILM TECHNIQUES AND MATERIALS IN THE PRODUCTION OF COMPLEX HYBRID MODULES  
 KIRBY, P.L.  
 WILLYN ELECTRIC LTD., BEDFORD, ENGLAND  
 ELECTRONIC INDUSTRIES ASSOC. FRANCE, ET AL.  
 INTERNATIONAL CONFERENCE ON MANUFACTURING AND PACKAGING  
 TECHNIQUES FOR HYBRID CIRCUITS, 155-62 1976  
 7 APRIL 1976 PARIS, FRANCE  
 ELECTRONIC INDUSTRIES ASSOC. FRANCE, PARIS, FRANCE  
 THE SUPERFICIAL SIMILARITY BETWEEN TODAY'S THICK FILM HYBRID CIRCUITS AND SOME OF THE EARLIEST PRODUCTS OF THICK FILM TECHNOLOGY IN THE EARLY 1970'S IS MISLEADING. THERE HAS BEEN SIGNIFICANT PROGRESS IN EVERY ASPECT OF THE SUBJECT AND THIS PAPER SHOWS HOW MANY OF THESE IMPROVEMENTS CAN BE BROUGHT TOGETHER TO PRODUCE A NEW RANGE OF ADVANCED HYBRID MODULES WHICH ARE INCAPABLE OF REALISATION BY ANY OTHER AVAILABLE TECHNIQUE. THE IMPROVED STABILITY OF THICK FILM RESISTORS; THE INCREASED RELIABILITY OF THICK FILM HYBRID CIRCUITS; THEIR LOW NOISE AND ULTRALOW LINEARITY; THEIR IMPROVED COMPATIBILITY WITH THICK FILM CONDUCTORS WHICH THEMSELVES SHOW IMPROVED BONDING PROPERTIES; THE AVAILABILITY OF SEMICONDUCTOR CHIPS FOR DIRECT ATTACHMENT TO THICK FILM CONDUCTORS AND THE RELIABILITY WHICH CAN NOW BE ACHIEVED IN FINE WIRE BONDING CAN ALL BE INTEGRATED WITH HIGH ACCURACY FUNCTIONAL RESISTOR ADJUSTMENT AND ENCAPSULATION IN A FULLY HERMETIC PACKAGE. THESE ACHIEVEMENTS ARE ILLUSTRATED BY REFERENCE TO COMPLEX HIGH DENSITY MODULES WHICH HAVE BEEN PRODUCED FOR A VARIETY OF HIGH RELIABILITY APPLICATIONS.  
 Identifiers: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS  
 : INTEGRATED CIRCUIT PRODUCTION  
 : HYBRID MODULES  
 06  
 Section Class Codes: B7540, B7522, B1269  
 Unfiled Class Codes: SMEAB, SMCCAX, ADOMAE

981568 B7646568  
 ATMOSPHERE THAT CONTAINED A 0.3 PPM SO<sub>2</sub>/SUB 2/ ADDITION (4 Refs)  
 Descriptors: HYBRID INTEGRATED CIRCUITS; INTEGRATED CIRCUIT PRODUCTION; THICK FILM CIRCUITS  
 Identifiers: CONDUCTOR MATERIALS; THICK FILM; HYBRID CIRCUITS; SELECTION CRITERIA; SOLDERABILITY; ADHESION; ALUMINA SUBSTRATE; ELECTRICAL ISOLATION BETWEEN CLOSELY SPACED CONDUCTORS  
 06  
 Section Class Codes: B7540, B7522, B1269  
 Unfiled Class Codes: SMEAB, SMCCAX, ADOMAE

981569 B7646569  
 COMPARISON BETWEEN THICK AND THIN FILMS TECHNOLOGIES  
 JOLLY, J.  
 DEPI. CIRCUITS INTEGRÉS HYBRIDES, LTT, CONFLEANS-SITE-HONORIN-E, FRANCE  
 ELECTRONIC INDUSTRIES ASSOC. FRANCE, ET AL.  
 INTERNATIONAL CONFERENCE ON MANUFACTURING AND PACKAGING  
 TECHNIQUES FOR HYBRID CIRCUITS, 25-33 1976  
 7-8 APRIL 1976 PARIS, FRANCE  
 ELECTRONIC INDUSTRIES ASSOC. FRANCE, PARIS, FRANCE  
 TWO TECHNOLOGIES HAVE BEEN USED FOR TEN YEARS TO MANUFACTURE HYBRID INTEGRATED CIRCUITS. PASSIVE SUBSTRATES MADE OF PHOTO-FEELCHED THIN FILMS CAN BE REPLACED BY PASSIVE SCREENED THICK FILM SUBSTRATES. HIGH RELIABILITY MICROELECTRONICS MOSTLY USING THIN FILM TECHNIQUES ARE NOW SWITCHING TO THICK FILM FOR SOME APPLICATIONS. BOTH TECHNOLOGIES HAVE BEEN USED FOR THE DESIGN OF THE SAME MILITARY COMMUNICATION CIRCUITS. THIS STUDY SPONSORED BY THE FRENCH SECTION DÉTÉDUS ET FAIRIQUATIONS DES TELECOMMUNICATIONS WAS DIRECTED TO THE MANUFACTURE OF HYBRID INTEGRATED CIRCUITS FOR RDTA SYSTEMS.  
 Relays; GENERATOR, THE PURPOSE WAS TO INTEGRATE THE FOLLOWING CIRCUITS: CLOCK AMPLIFIER, EQUALIZER, LEVEL DETECTOR, CLOCK FREQUENCY REGULATOR AND TO COMPARE FROM A TECHNICAL AND ECONOMIC POINT OF VIEW THE USE OF THIN AND THICK FILM TECHNOLOGIES (1 Ref.)  
 Descriptors: HYBRID INTEGRATED CIRCUITS; INTEGRATED CIRCUIT PRODUCTION; THICK FILM CIRCUITS; THIN FILM CIRCUITS; REPEATERS  
 : MILITARY SYSTEMS; MILITARY EQUIPMENT  
 Identifiers: MANUFACTURE; THIN FILMS; MICROELECTRONICS;  
 MILITARY COMMUNICATION CIRCUIT; HYBRID INTEGRATED CIRCUITS;  
 REPEATER; THICK FILM  
 06  
 Section Class Codes: B7540, B7522, B7524, B1269, B1560  
 Unfiled Class Codes: SMEAB, SMCCAX, SMCEAH, ADOMAE, FEKAA  
 Language: FRENCH

981567 B7646567  
 THE SELECTION OF CONDUCTOR MATERIALS FOR THICK FILM HYBRID CIRCUITS  
 PATRANELLI, G.P.; SEDORA, E.J.  
 BELL TELEPHONE LAB. INC., ALLEGHENY, PA, USA  
 ELECTRONIC INDUSTRIES ASSOC. FRANCE, ET AL.  
 INTERNATIONAL CONFERENCE ON MANUFACTURING AND PACKAGING  
 TECHNIQUES FOR HYBRID CIRCUITS, 133-40 1976  
 7-8 APRIL 1976 PARIS, FRANCE  
 ELECTRONIC INDUSTRIES ASSOC. FRANCE, PARIS, FRANCE  
 THIS PAPER DISCUSSES THE SELECTION OF THICK FILM CONDUCTOR MATERIALS. THE SPECIFIC SELECTION CRITERIA CONSIDERED ARE BASED ON THE SOLDERABILITY OF THE CONDUCTOR, THE ADHESION OF THE CONDUCTOR TO A SUBSTRATE, THE ELECTRICAL ISOLATION BETWEEN CLOSELY SPACED CONDUCTORS UNDER VOLTAGE BIAS IN HIGH HUMIDITY. IN ADDITION, THE ELECTRICAL ISOLATION BETWEEN CLOSELY SPACED CONDUCTORS UNDER BIAS WAS STUDIED IN A SPECIAL ENVIRONMENTAL CHAMBER THAT EXPOSED THE SAMPLES TO HIGH TEMPERATURE, HIGH HUMIDITY AND A DYNAMIC GAS

981557 B7646557 THIN FILM HYBRID MICROCIRCUITS ON POLYMER SUBSTRATES  
HICHS, R. E.; ZIMMERMAN, D. D.  
APPL. PHYS. LAB., JOHNS HOPKINS UNIV., LAUREL, MD, USA  
ELECTRONIC INDUSTRIES ASSOC. (FRANCE), ET AL.  
INTERNATIONAL CONFERENCE ON MANUFACTURING AND PACKAGING  
TECHNIQUES FOR HYBRID CIRCUITS 19-23 1976  
7-11 APRIL 1976 PARIS, FRANCE  
ELECTRONIC INDUSTRIES ASSOC., FRANCE, PARIS, FRANCE  
PUBLISHERS HAVE A UNIQUE COMBINATION OF PROPERTIES  
MAKING THEM IDEALLY SUITED FOR HYBRID MICROCIRCUIT SUBSTRATES  
AND ASSEMBLY INTERCONNECTION TECHNIQUES. THEY MAINTAIN  
DISCRETE, CHEMICAL, ELECTRICAL, AND PHYSICAL PROPERTIES OVER A  
WIDE TEMPERATURE RANGE. RESULTS OF STUDIES OF THESE PROPERTIES  
ARE PUBLISHED IN EXAMPLES OF DEVELOPMENTAL PROTOTYPE HYBRID  
DESIGNS AND SYSTEM PACKAGING SCHLICHERS USING THIN FILM  
TECHNIQUES. (2 Refs.)  
Designers: THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS;  
INTEGRATED CIRCUIT FABRICATION; PACKAGING;  
Identifiers: POLYMER SUBSTRATES; HYBRID MICROCIRCUIT;  
PACKAGING; THIN FILM  
01 Section Class Codes: B2540, B2524, B1266, B1269  
Unified Class Codes: SMEAB, SMCEAH, ADGHAH, ADGMAE

BECKMAN INSTRUMENTS LTD., GLENROTHES, SCOTLAND  
MICROELICTRONICS AND RELIAB. (GB) NO.4 335-8  
1976 Coden: MCPLAS 335-8  
ANNUAL SEMINAR TECHNICAL SEMINAR 22-26 MARCH 1976  
LONDON, ENGLAND  
DISCUSSES THE THREE MAIN REASONS TO BUY HYBRID ICS;  
TECHNICAL CONSIDERATIONS, PROVEN OF THE SHELF DESIGNS AND  
ECONOMICS. SPECIFICATION REQUIREMENTS ARE DISCUSSED  
DESCRIPTIONS: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS  
Identifiers: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; ECONOMICS; THICK  
FILM ICS; PROVEN DESIGNS ADVANTAGE; SPECIFICATION REQUIREMENTS  
06 Section Class Codes: B2540, B2522  
Unified Class Codes: SMEAB, SMCCAX

901547 B7646547 RIBBON WIRE VERSUS ROUND WIRE RELIABILITY FOR HYBRID  
MICROCIRCUITS  
GUIDICI, D.C.  
FAIRCHILD SEMICONDUCTOR, MOUNTAIN VIEW, CA, USA  
ELECTRON. INF. AND PLANN. (INDIA) VOL. 3, NO.8 664-8  
MAY 1976 Coden: ELIPS  
IN AN EFFORT TO CREATE A MORE RELIABLE BOND INTERFACE IN  
HYBRID MICROCIRCUITS A STUDY WAS LAUNCHED TO EVALUATE THE  
RELATIVE BOND STRENGTHS OF ROUND WIRE AND RIBBON WIRE OF  
COMPARABLE CROSS SECTION, AND TO DETERMINE WHICH IS INHERENTLY  
MORE RELIABLE AFTER THERMAL DEGRADATION. THIS PAPER PRESENTS A  
COMPARATIVE BONDING RELIABILITY STUDY OF ALUMINUM RIBBON WIRE  
VERSUS ROUND WIRE, AND GOLD RIBBON WIRE VERSUS ROUND WIRE IN  
HYBRID MICROCIRCUITS.  
Identifiers: HYBRID INTEGRATED CIRCUITS; CIRCUIT RELIABILITY  
; WIRING  
02 Section Class Codes: B2540, B1263, B2240  
Unified Class Codes: SMEAB, ADGDA, SENAAO

981550 B7646550 THE USE OF NiCR-Ni-AUO AND CrNiAl-Ni-AUO THIN FILM  
STRUCTURES IN MODULAR CIRCUITS  
SANDOLIK, J.  
THIN SOLID FILMS, (SWITZERLAND) VOL.36, NO.2 375-8 2  
AUG. 1976 Coden: THSFAP  
3RD INTERNATIONAL CONFERENCE ON THIN FILMS 25-29 AUG. 1975  
BUDAPEST, HUNGARY  
A HYBRID THIN FILM TECHNOLOGY HAS BEEN DEVELOPED TO DESIGN  
AND FABRICATE (1) A DECODING RESISTOR NETWORK, (2) AN INTERNAL  
OR EXTERNAL REFERENCE CIRCUIT, AND (3) AN ANALOGUE VOLTAGE  
SWITCHING CIRCUIT FOR A D/A CONVERTER (3 Refs.)  
Designers: HYBRID INTEGRATED CIRCUITS; INTEGRATED CIRCUIT  
PRODUCTION; THIN FILM CIRCUITS; MODULES; THIN FILM RESISTORS;  
DECODING; SWITCHING CIRCUITS; DIGITAL-ANALOGUE CONVERSION  
Identifiers: NiCr-Ni-AUO; CrNiAl-Ni-AUO; THIN FILM  
STRUCTURES; MODULAR CIRCUITS; HYBRID THIN FILM TECHNOLOGY;  
DECODING RESISTOR NETWORK; REFERENCE CIRCUIT; ANALOGUE VOLTAGE  
SWITCHING CIRCUIT; D/A CONVERTER  
06 Section Class Codes: B2540, B2524  
Unified Class Codes: SMEAB, SMCEAH

901549 B7646549 THIN FILM HYBRID MICROCIRCUITS-GENERAL APPLICATIONS  
(RELATIONS TO USE THEM)  
WITTEN, D.

981546 B764546 SIMPLE TECHNIQUES OF HYBRID FAILURE ANALYSIS AND STEREO RADIOGRAPHY OF COMPLEX MICROCIRCUITS

GUIDICI, D.C. FAIRCHILD SEMICONDUCTOR, MOUNTAIN VIEW, CA, USA

INF. AND PLAN., (INDIA) VOL. 3, NO. 8

MAY 1976 Cited: ELLIPS

Presents examples of four types of hybrid microcircuits, each fabricated with various materials, then demonstrates the various methods used for mechanical failure analysis. Some of the simplest techniques used for opening packages and removing components are shown. Also, the value of radiography to look before opening, and the use of stereo radiography as applied to multilayered packages are discussed.

Discr. ref.: HYBRID INTEGRATED CIRCUITS; ELECTRICAL FAULTS; FAILURE ANALYSIS; RADIOGRAPHY

Identifiers: HYBRID MICROCIRCUITS; MECHANICAL FAILURE ANALYSIS; RADIOGRAPHY; STEREO RADIOGRAPHY; MULTILAYERED ANALYSIS; HYBRID FAILURE ANALYSIS; COMPLEX MICROCIRCUITS; PACKAGE OPENING

02 Section Class Codes: B2540, B1263, B1268

Unified Class Codes: SMEAAB, ADGDAZ, ZGIAAA

MORE ABOUT THE MICROSTRUCTURE OF THICK FILM MATERIALS

SCHNEIDER, B.; ZLOOF, H.; VINIKMAN, V.; SAMUEL, A.

ELTA-ELECTRONICS INDUSTRIES LTD., ASHDOD, ISRAEL

IEEE 9TH CONVENTION OF ELECTRICAL AND ELECTRONIC ENGINEERS IN

ISRAEL 02-21-13 1975 TEL AVIV, ISRAEL

IEEE, NEW YORK, USA

A microstructure was performed using a scanning electron microscope. The various materials bulk and interfacial structure were studied. Correlations between the effects of processing conditions on electrical parameters, sheet resistance and thermal coefficient of resistance were performed with respect to microstructure. This work serves to optimize processing conditions for improving quality and increasing reliability of thick film multilayer microcircuits

(17 refs.)

981475 B764547 A NEW FABRICATION APPROACH TO ADVANCED ELECTRONICS

FROMEK, D.W. DEPT. OF ELECTRICAL ENGRG., UNIV. OF ALABAMA, HUNTSVILLE.

AL, USA

IEEE PROCEEDINGS OF 1975 IEEE SOUTHEASTON REGION 3 CONFERENCE ON ELECTRICITY AND EXPANDING TECHNOLOGY 50-3/1-3 1975

IEEE, NEW YORK, USA

The micaply laminate is an economic thin-film substrate that can reduce prototype costs of small production facilities, and can reduce laboratory environment. Original design, the university, and student laboratory experiments are key factors in these creativity, and may be easily employed in conventional printed circuit facilities

Identifiers: THIN FILM CIRCUITS; INTEGRATED CIRCUIT PRODUCTION

Identifiers: NEW FABRICATION APPROACH; ADVANCED ELECTRONICS; MICAPLY LAMINATE; SMALL PRODUCTION FACILITIES; UNIVERSITY LABORATORY ENVIRONMENT; PRINTED CIRCUIT; THIN FILM SUBSTRATE; ECO-OPALICS

06 Section Class Codes: B2524, B1267

Unified Class Codes: SMEAAB, ADGKAT

981431 B7646399 LASER FUNCTIONAL TRIMMING TECHNIQUES FOR CONSUMER THICK FILM CIRCUITS

BRIGMAN, J.M. PHILLIPS LABORATOIRE VIDEO SK3, EINDHOVEN, NETHERLANDS

INTERNATIONAL CONFERENCE ON MANUFACTURING AND PACKAGING TECHNIQUES FOR HYBRID CIRCUITS, 87-97 1976 7-8 APRIL 1976 PARIS, FRANCE

174 MANUFACTURERS ASSOC. PARIS, FRANCE STEL'S INCLUDE THE LASER ADJUSTMENT OF CIRCUIT ELEMENTS TO PREFERRED VALUES AND TOLERANCES. IN MANY CASES IT IS DESIRABLE TO TRIM THE RESISTOR OR CAPACITOR TO AN UNKNOWN RESISTANCE OR CAPACITANCE VALUE, USING CIRCUIT PARAMETER TO CHECK CONTINUOUSLY THE CIRCUIT RESPONSE AND TO CONTROL THE LASER BEAM. THIS PROCEDURE IS KNOWN AS FUNCTIONAL TRIMMING. IN THE CONSUMER ELECTRONICS AREA THIS PROCEDURE IS A PREFERRED ONE, WHILE IT OFTEN ELIMINATES STATIC TRIMMING OF THICK FILM COMPONENTS AND/OR THE NEED FOR DISCRETE COMPONENT SELECTION (8 Refs)

Descriptors: THICK FILM CIRCUITS; LASER BEAM APPLICATIONS; INTEGRATED CIRCUIT PRODUCTION

Identifiers: THICK FILM CIRCUITS; MANUFACTURING; LASER BEAM; CONSUMER ELECTRONICS AREA; TRIMMING  
06

Section Class Codes: B2522, B1269, B2980

Unified Class Codes: SMCCAX, ADGMAE, EGMAAA

1976 Coden: THSFAP 3RD INTERNATIONAL CONFERENCE ON THIN FILMS 25-29 AUG. 1975 BUDAPEST, HUNGARY

ABSTRACT: ONLY GIVEN, SUBSTANTIALLY AS FOLLOWS: TRENDS IN THE DEVELOPMENT OF THIN FILM POTENTIOMETERS ARE DISCUSSED. A PRIME ADVANTAGE IS IN THE MULTILAYER STRUCTURE OF THE RESISTIVE FILM WHICH GIVES EXCELLENT ELECTRICAL CHARACTERISTICS ESPECIALLY WITH REGARD TO THE SLIDING CONTACT RESISTANCE. A SPECIFIC DESIGN OF A MINIATURE TRIMMING POTENTIOMETER FOR PROFESSIONAL USE IS DESCRIBED

Descriptors: THIN FILM CIRCUITS; THIN FILM RESISTORS; POTENTIOMETERS; INTEGRATED CIRCUIT PRODUCTION  
Identifiers: THIN FILM POTENTIOMETERS; MULTILAYER STRUCTURE; RESISTIVE FILM; ELECTRICAL CHARACTERISTICS; SLIDING CONTACT RESISTANCE; DESIGN; MINIATURE TRIMMING POTENTIOMETER  
06

Section Class Codes: B2210, B2524

Unified Class Codes: SEEAA5, SMCEAH

980785 B7645635 AN INTEGRATED ALL-THIN-FILM DIGITAL TIMER

CRESWELL, M.W.; SIEKIEWICZ, L.J.; BOEHL, G.F.; YU, K.K.I. CSAKARY, T.; ROCES, W.L. WESTINGHOUSE RES. LABS., PITTSBURGH, PA., USA

WINER, L.;

1976 IEEE INTERNATIONAL SOLID-STATE CIRCUITS CONFERENCE.  
(DIGEST OF TECHNICAL PAPERS) 44-5 229 1976  
18-20 FEB. 1976 PHILADELPHIA, PA., USA  
A RANDOM LOGIC LSI DIGITAL TIMER CIRCUIT WITH OVER 550 TRANSISTORS DEPOSITED ON A GLASS SUBSTRATE IS DESCRIBED. THE CIRCUIT WAS SELECTED PRIMARILY AS A VEHICLE TO ESTABLISH THE VIABILITY OF THIN-FILM TECHNOLOGY IN THIS FIELD (1 Refs)

Descriptors: DIGITAL INTEGRATED CIRCUITS; LARGE SCALE INTEGRATION; TIMING CIRCUITS; THIN FILM CIRCUITS  
Identifiers: RANDOM LOGIC; DIGITAL TIMER CIRCUIT  
SUBSTRATE; LSI; THIN FILM TECHNOLOGY  
06

Section Class Codes: B1870, B4441, B2524  
Unified Class Codes: ETNAAP, BKEGAY, SMCEAH

980128 B7646396 THICK FILM HYBRIDS IN NEW ZEALAND

DE KOCK, D.L.

PHYS., AND ENGNG. LAB., DEPT. OF SCI. AND INDUSTRIAL RES.,

WELLINGTON, NEW ZEALAND

N.Z. ENG. (NEW ZEALAND) VOL.31, NO.6 162-4 15 JUNE

1976 Coden: NZENAS

THE RELATIVELY LOW SETTING-UP COST OF A THICK FILM PLANT

MAKES IT A TECHNOLOGY ATTRACTION TO NEW ZEALAND AND GIVES A

SMALL PRODUCTION RUNS OF A VARIETY OF CIRCUITS ARE MORE COMMON

THAN VERY LARGE RUNS OF A SINGLE CIRCUIT (2 Refs)

Descriptors: THICK FILM CIRCUITS  
02

Section Class Codes: B2522

Unified Class Codes: SMCCAX

980031 B7645923 THIN FILM MINIATURE POTENTIOMETERS

TAZLIS, R.; KASMY, E.

LEVI, LUBLJANA, YUGOSLAVIA

THIN SOLID FILMS (SWITZERLAND)

VOL.36, NO.2 370 2 AUG.

980134 B7644921  
STATEMENT AND PROSPECTS FOR HYBRID CIRCUIT USE IN THE FRENCH  
POST OFFICE  
DELIGNE, HENRY; MOURRET,  
CHTE, LAYON, FRANCE  
ELECTRONIC INDUSTRIES ASSOC. FRANCE, ET AL.  
INTERNATIONAL CONFERENCE ON MANUFACTURING AND PACKAGING  
TECHNIQUES FOR HYBRID CIRCUITS 259 1976  
7-11 APR 11 1976 PARIS, FRANCE  
ELECTRONIC INDUSTRIES ASSOC. FRANCE PARIS, FRANCE  
THICK AND THIN FILM HYBRID MICRO CIRCUITS ARE USED FOR OVER  
FIVE YEARS IN EQUIPMENT MADE FOR THE FRENCH POST OFFICE  
(HYBRID MULTILEVELS FOR ANALOG, TRANSMISSION, OPERATIONAL  
RELIABILITY RESULTS ARE GIVEN AND COMPARED WITH COMPUTATIONS  
BASING ON DATA FOR SYSTEMS USING DISCRETE COMPONENTS. AFTER  
SOM INSIGHT INTO THE ECONOMICS OF THESE TECHNOLOGIES THEIR  
FUTURE USE, SPECIALLY IN THE TELECOMMUNICATION AREA IS  
REVIVED. DISTINCTION IS MADE BETWEEN APPLICATIONS WHERE THE  
HYBRID TECHNOLOGY IS OF INTRINSIC VALUE AND THE OTHER ONES  
WHERE THE TECHNICAL EVOLUTION WILL ALLOW SIGNIFICANT COST  
REDUCTION IN THE FUTURE WHEN COMPARED WITH MORE CONVENTIONAL  
TECHNOLOGIES  
Descriptors: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS  
: THIN FILM CIRCUITS; CIRCUIT RELIABILITY  
Identifiers: HYBRIDS; CIRCUITS; THIN FILM;  
RELIABILITY; ECONOMICS; HYBRIDS;  
Section Class Codes: B1263, B2522, B2540, B3500  
Unified Class Codes: ADD01, SM002, SMEAB, SMEAG  
Language: FRENCH

970619 B7643475  
THICK FILM HYBRID TECHNIQUES OFFER NEW HOPE FOR THE BLIND  
METHERMING, D.  
ELECTRON. ENGINEERING (GB) VOL.48, NO.5B2 27-9 AUG.  
1976 Coden: ELECA9  
Describes these developments for implantable electronics and  
some associated work that is likely to benefit an even wider  
audience (2 refs)  
Descriptors: SENSORY AIDS; PROSTHETICS; THICK FILM CIRCUITS;  
HYBRID INTEGRATED CIRCUITS  
Identifiers: IMPLANTABLE ELECTRONICS; BIOMEDICAL ELECTRONICS;  
THICK FILM HYBRID IC TECHNIQUE; BLIND AIDS; SENSORY AIDS;  
ARTIFICIAL VISION; ENCAPSULATION; VISUAL PROSTHETICS  
02  
Section Class Codes: B4600, B2540, B2522  
Unified Class Codes: ZRWEAV, SMEAB, SMECAK

969106 B7641606  
THE ROLE OF THIN FILM HYBRID MICRO CIRCUITS IN ELECTRONICS  
LAI, J.T.  
FERANCI LTD., EDINBURGH, SCOTLAND  
THIN SOLID FILMS (SWITZERLAND) VOL.36, NO.2 323-9 2  
AUG. 1976 Coden: THSFAP  
3RD INTERNATIONAL CONFERENCE ON THIN FILMS 25-29 AUG. 1975  
BUDAPEST, HUNGARY  
The author examines the role of thin film resistors in a/d  
hybrids. Ics with particular reference to applications (synchro  
and d/a converters, electronic scot-t converters, synchro  
output signal encoders) and the nonlinear function generator.  
The monotonically decreasing derivative function generator  
(the mud function generator), some general comments on  
trimming, especially functional trimming and encapsulation are  
included  
Descriptors: THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS;  
THIN FILM RESISTORS; ANALOGUE-DIGITAL CONVERSION; FUNCTION GENERATORS;  
DIGITAL-DIGITAL CONVERSION; ENCODING; FUNCTION GENERATORS;  
INTEGRATED CIRCUIT PRODUCTION; ENCAPSULATION  
Identifiers: THIN FILM HYBRID MICRO CIRCUITS; THIN FILM  
RESISTORS; HYBRID ICS; D/A CONVERTERS; ELECTRONIC SCOT-T  
CONVERTERS; SYNCHRO OUTPUT SIGNAL ENCODERS; NONLINEAR FUNCTION  
GENERATOR; MONOTONICALLY DECREASING DERIVATIVE FUNCTION  
GENERATOR; MUD FUNCTION GENERATOR; TRIMMING; FUNCTIONAL  
TRIMMING; ENCAPSULATION; A/D CONVERTERS  
06  
Section Class Codes: B2540, B2524, B1890  
Unified Class Codes: SMEAB, SMEAH, ETIAC  
Language: FRENCH

980151 B7644606  
HYBRID THICK FILM TECHNOLOGY TEACHING IN LILLE I.U.T.  
LILLOU, Y.; DESCARPS, M.; VERNET, M.  
DRT, GENIE ELECTRIQUE, UNIV. DES SCI. ET TECH. DE LILLE,  
VILLEURQUE D'ASCO, FRANCE  
ELECTRONIC INDUSTRIES ASSOC. FRANCE, ET AL.  
INTERNATIONAL CONFERENCE ON MANUFACTURING AND PACKAGING  
TECHNIQUES FOR HYBRID CIRCUITS 219-27 1976  
7-11 APRIL 1976 PARIS, FRANCE  
ELECTRONIC INDUSTRIES ASSOC. FRANCE PARIS, FRANCE  
PRINCIPLES AND FABRICATION OF HYBRID CIRCUITS (THICK FILM)  
HAVE BEEN TAUGHT IN THE INSTITUTE GENIE ELECTRIQUE (I.U.T.  
LILLE) SINCE 1973. THE PURPOSE OF THIS PAPER IS TO REPORT THE  
AUTHORS' EXPERIENCE AND TO GIVE A FEW DETAILS ABOUT THE  
DEVICES WHICH WERE STUDIED AND ACHIEVED BY THE STUDENTS  
Descriptors: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS  
: TEACHING; INTEGRATED CIRCUIT PRODUCTION  
Identifiers: THICK FILM TECHNOLOGY; TEACHING; FABRICATION;  
05  
Section Class Codes: B1220, B2500, B2522  
Unified Class Codes: ADD01, SMEAB, SMECAK  
Language: FRENCH

969105 B7641605

THE RELATIVE MERITS OF THIN FILM AND THICK FILM TECHNOLOGY  
IN MICROELECTRONICSFORLANI, F.  
MAGNETI MARTELLI, DIV. ELECTRONICA FIVRE, PAVIA, ITALY  
THIN SOLID FILMS (SWITZERLAND)  
VOL.36, NO.2 313-22 2  
AUG. 1976 Coden: THSFAP3RD INTERNATIONAL CONFERENCE ON THIN FILMS 25-29 AUG. 1975  
BUDAPEST, HUNGARY  
The author first reviews the history of thin and thick films used in hybrid IC manufacture and some characteristics and applications of the two technologies are examined. The merits of electronic conduction and noise in thick films are discussed. The future for thick film technology is appraised. (28 Refs.)  
Designers: THICK FILM CIRCUITS; THIN FILM CIRCUITS;  
INTEGRATED CIRCUIT PRODUCTION; HYBRID INTEGRATED CIRCUITS;  
Manufacturers: THICK FILM TECHNOLOGY; MICROELECTRONICS;  
Manufacturers: ELECTRONIC MATERIALS; MECHANISMS; ELECTRONIC  
HISTORY; HYBRID IC; MANUFACTURE; FUTURE; THIN FILM TECHNOLOGY  
Continuous: NOISE; FUTURE; THIN FILM TECHNOLOGY  
Of:Section Class Codes: B2540, B2522, B2524  
Unified Class Codes: SM2A0, SM2CAX, SM2A0HINST. FOR CHEM. TECHNOL. AND METALL., BELGRADE, YUGOSLAVIA  
THIN SOLID FILMS (SWITZERLAND) VOL.36, NO.2 348 2 AUG.  
1976 Coden: THSFAP

3RD INTERNATIONAL CONFERENCE ON THIN FILMS 25-29 AUG. 1975

BUDAPEST, HUNGARY  
SUMMARY ONLY GIVEN. SUBSTANTIALLY AS FOLLOWS: THE RESULTS OF THE DESIGN AND DEVELOPMENT OF A HIGHLY STABLE THIN FILM NICH ATTENUATOR CIRCUIT ARE DESCRIBED. THE ELECTRICAL PARAMETERS OF THE CIRCUIT ARE: (1) IN THE ATTENUATION RANGE 0.1-3.8 NP, ZSUB C=6000MEGA; (11) IN THE ATTENUATION RANGE 0.4-2.2 NP, ZSUB C=1500 OMEGA; (111) POWER DISSIPATION 1.25 mW; (1IV) RESISTOR TOLERANCE +0P-2P PERCENT. THE ELECTROPHYSICAL PROPERTIES OF A THIN NICH (B0120) FILM, DEPOSITED BY VACUUM EVAPORATION, ARE EXAMINED FOR USE AS A PRIMARY RESISTOR MATERIAL. THE CONDUCTING FILMS ARE PREPARED BY EVAPORATION OF NI IN THE SAME VACUUM CYCLE. RESISTOR LOAD LIFE DRIFT (1000 H AT 70 DEGREES C, P/SUN D/125 MW) IS LESS THAN 0.1 PERCENT. THE TCR (4-40 DEGREES C TO 800 DEGREES C) IS LESS THAN 40M-50 PPM DEGR/DEG/SUP-1/ AND THE TEMPERATURE CYCLING RESISTANCE DRIFTS IS LESS THAN 0.1 PERCENT.  
Designers: THIN FILM CIRCUITS; ATTENATORS; THIN FILM RESISTORS;  
Identifiers: CHARACTERISTICS; THIN FILM INTEGRATED CIRCUITS;  
Designers: DEVELOPMENT; THIN FILM NICH ATTENUATOR CIRCUIT;  
Electrical Parameters: ATTENUATION; POWER DISSIPATION;  
Resistor Tolerance: ELECTROPHYSICAL PROPERTIES; THIN NICH;  
Primary Resistor Material: CONDUCTING FILMS; LOAD LIFE DRIFT;  
Temperature Cycling: RESISTANCE DRIFTS; STABILITY; PRECISION;  
Termination: SUBSTRATE SIZE; SUBSTRATE SHAPE;  
ZSUB C/; VACUUM EVAPORATION; TERMINATION LOCATION; PACKAGING TECHNIQUE;  
Substrate Material; Termination Location; Precision

969014 B7641583 THE MANUFACTURE OF DISTRIBUTED RC CIRCUITS BY HAFNIAUM

TECHNOLOGY

LIPAVORYI, S.; SUNI, I.; STUBB, T.

DIV. OF ELECTRICAL ENGG., UNIV. OF OULU, OULU, FINLAND

THIN SOLID FILMS (SWITZERLAND) VOL.36, NO.2 365-9 2  
AUG. 1976 Coden: THSFAP3RD INTERNATIONAL CONFERENCE ON THIN FILMS 25-29 AUG. 1975  
BUDAPEST, HUNGARY  
In pursuing their goal of producing HF sputtered resistors and capacitors of distributed circuits in the same vacuum, the difficulties across in the production of the capacitors, this report describes the manufacture of the capacitors, the physical and characteristics (loss coefficient, capacitance ratio of dielectric constant, leakage current) of the film capacitors. Designers: THIN FILM CAPACITORS; THIN FILM CIRCUITS; DISTRIBUTED CIRCUIT PRODUCTION; DISTRIBUTED PARAMETER NETWORKS; Manufacture: DISTRIBUTED RC CIRCUITS;  
Identifiers: CHARACTERISTICS; LOSS COEFFICIENT;  
Capacitors: STRUCTURE; CAPACITANCE; LEAKAGE CURRENT;  
Capacitors: REAL PART OF DIELECTRIC CONSTANT; LEAKAGE CURRENT;  
HF THIN FILM TECHNOLOGY; THIN FILM CAPACITORS  
Of:Section Class Codes: B2524, B1800  
Unified Class Codes: SM2A0, ET2A0M969013 B7641582 DESIGN AND CHARACTERISTICS OF THIN FILM INTEGRATED CIRCUITS  
DANJVIC, G. D.; KOVACVIC, N. S.  
DANJVIC, G. D.; KOVACVIC, N. S.  
Section Class Codes: SM2A0, SM2A0H  
Unified Class Codes: SM2A0, SM2A0H

961794 B7637709, C7625513  
DATA ACQUISITION IN A DIP SHRINK SYSTEMS  
CALHOUN, R.; BERG, A., JR.  
MICRO NETWORKS CORP., WORCESTER, MA, USA  
ELECTRONICS (USA) VOL.49, NO.14 77-83 8 JULY 1976  
Code: ELCACD  
Discusses the application of twin-film hybrid technology making possible a complete eight-channel 8-bit system in a single 32-pin dual-in-line package. Aside from the obvious space savings, such a hybrid greatly simplifies the design of data-processing systems and often can result in considerable cost reduction. It effectively brings a systems function down to the component level.  
Discussions: DATA ACQUISITION; HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS; PACKAGING; ANALOGUE/DIGITAL CONVERSION  
Keywords: DATA ACQUISITION; DIL PACKAGE; THIN FILM HYBRID ICS; 8 CHANNEL 8 BIT SYSTEM; 32 PIN DIL PACKAGE  
02  
Section Class Codes: C9960, B2540, B2524, B1266  
Unified Class Codes: X7100, SMEAAB, SMECAH, ADGHAH

957029 B7637739  
TECHNOLOGICAL REQUIREMENTS FOR PORTABLE THICK FILM HYBRID DEVICES  
KICSI'S, A.; LEROUX, A.; RICHARD, S.; AUBE, G.; AUCOUTURIER, J.L.  
U.T.V. DE SHERBROOKE, QUEBEC, CANADA  
IEEE, NAT. ELECTRICAL MANUFACTURERS ASSOC., INST. PRINTED CIRCUITS, 12TH ELECTRICAL/ELECTRONICS INSULATION CONFERENCE 36-9  
1975 11-14 NOV. 1975 BOSTON, MASS., USA  
IEEE, NEW YORK, USA

This paper primarily comprises excerpts of the work done under a regular undergraduate teaching program. The material is organized into subject groupings with the intention of presenting in convenient form sufficient information for making high quality thick film portable devices. The work emphasizes problems and methods of solving the construction of a thick film digital wrist-watch prototype using a new PTAG ink and a novel procedure to fabricate thick film multilayer structures with unusually high line densities associated with increased yield as compared with previously known methods. Directions: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS

: C:OKUS  
Keywords: PORTABLE THICK FILM HYBRID DEVICES; PTAG INK; THICK FILM MULTILAYER STRUCTURES; HIGH LINE DENSITIES; TECHNOLOGICAL REQUIREMENTS; DIGITAL WRIST WATCH  
0.  
Section Class Codes: B2540, B2522  
Unified Class Codes: SMEAAB, SMECAH

957026 B7637736  
THIN FILM HYBRID MICROCIRCUITS ON POLYMER SUBSTRATES

HICKS, R.E.; ZIMMERMAN, D.O.

APL. PHYS. LAB., LAUREL, MD, USA

IEEE  
PROCEEDINGS OF THE 1976 IEEE SOUTHEASTCON REGION 3 CONFERENCE ON ENGINEERING IN A CHANGING ECONOMY 217-18  
1976 5-7 APRIL 1976 CLEMSON, S.C., USA  
IEEE, NEW YORK, USA  
Existing laboratory equipment and processes were used to investigate the substitution of polyimide film materials for alumina substrates using thin film, electroless plating and electroplating techniques. This study includes techniques for laminating multilayer polyimide boards with a unique plated through hole. Commercially available laminated polyimide materials are combined with these hybrid circuit techniques to produce an entire system. Hermetically sealed hybrid packages are essentially eliminated without sacrificing the ability to integrate them into the assembly if required. (2 Refs)

Descriptors: HYBRID INTEGRATED CIRCUITS; SUBSTRATES; POLYMERS; PACKAGING; INTEGRATED CIRCUIT PRODUCTION; THIN FILM CIRCUITS  
Identifiers: HYBRID MICROCIRCUITS; POLYIMIDE FILM; SUBSTRATES; THIN FILM; ELECTROLESS PLATING; ELECTROPLATING; PLATED THROUGH HOLE; HYBRID PACKAGES  
06  
Section Class Codes: B2540, B2524, B1266  
Unified Class Codes: SMEAAB, SMECAH, ADGHAH

957020 B7637730 TESTS FOR ELECTRICALLY ACTIVE SURFACE CONTAMINANTS FROM HYBRID MICROCIRCUIT ADHESIVES  
SUTTON, J.R.  
RELS. LAB., WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA., USA  
IEEE, ELECTRONIC INDUSTRIES ASSOC.  
261H ELECTRONIC COMPONENTS CONFERENCE 368-72 1976  
26-28 APRIL 1976 SAN FRANCISCO, CALIF., USA  
IEEE, NEW YORK, USA

TESTS ARE DESCRIBED OF THE EFFECTS OF OUTGASSING FROM TWO EPOXYES ON THE ELECTRICAL BEHAVIOR OF SPECIAL MOS-TYPE TEST VEHICLES AND OF SURFACE SENSITIVE DIPOLEAR TRANSISTORS. A STRONG CORRELATION IS SHOWN BETWEEN SURFACE POTENTIAL CHANGES WITH TIME IN THE TEST VEHICLES AND CHANGES IN THE SURFACE CURRENT WHICH AFFECT CURRENT OF TRANSISTOR BASE. CURRENT SUGGESTIONS FOR SCREENING CONDUCTION-BASE CURRENT GAIN ATTACHMENT APPLICATIONS ARE GIVEN (6 Refs.)  
Descriptors: HYBRID INTEGRATED CIRCUITS; ASSEMBLING; INITIATED CIRCUIT PRODUCTION  
Identifiers: ELECTRICALLY ACTIVE SURFACE CONTAMINANTS; HYBRID MICROCIRCUIT ADHESIVES; OUTGASSING; EPOXIES; SURFACE SENSITIVE BIPOLAR TRANSISTORS; MOS DEVICES  
Section Class Codes: B2540, B2550  
Unified Class Codes: SMEAAB, SMEAAG

957017 B7637727 TEST FOR ELECTRICALLY ACTIVE SURFACE CONTAMINANTS FROM HYBRID MICROCIRCUIT ADHESIVES  
KELFISER, F.Z.; HINMEL, R.P.; SCAPPLE, R.Y.  
HUGHES AIRCRAFT CO., CULVER CITY, CA, USA  
IEEE, ELECTRONIC INDUSTRIES ASSOC.  
26TH ELECTRONIC COMPONENTS CONFERENCE 292-9 1976  
26-28 APRIL 1976 SAN FRANCISCO, CALIF., USA  
IEEE, NEW YORK, USA

TESTS ARE DESCRIBED OF THE EFFECTS OF OUTGASSING FROM TWO EPOXYES ON THE ELECTRICAL BEHAVIOR OF SPECIAL MOS-TYPE TEST VEHICLES AND OF SURFACE SENSITIVE DIPOLEAR TRANSISTORS. A STRONG CORRELATION IS SHOWN BETWEEN SURFACE POTENTIAL CHANGES WITH TIME IN THE TEST VEHICLES AND CHANGES IN THE SURFACE CURRENT WHICH AFFECT CURRENT OF TRANSISTOR BASE. CURRENT SUGGESTIONS FOR SCREENING CONDUCTION-BASE CURRENT GAIN ATTACHMENT APPLICATIONS ARE GIVEN (6 Refs.)  
Descriptors: HYBRID INTEGRATED CIRCUITS; ASSEMBLING; INITIATED CIRCUIT PRODUCTION  
Identifiers: ELECTRICALLY ACTIVE SURFACE CONTAMINANTS; HYBRID MICROCIRCUIT ADHESIVES; OUTGASSING; EPOXIES; SURFACE SENSITIVE BIPOLAR TRANSISTORS; MOS DEVICES  
Section Class Codes: B2540, B2550  
Unified Class Codes: SMEAAB, SMEAAG

957019 B7637729 THIN FILM RESISTOR NETWORKS IN HYBRIDS  
GROTH, L.  
HILLIARD DIV, BECKMAN INSTRUMENTS INC., FULLERTON, CA, USA  
IEEE, ELECTRONIC INDUSTRIES ASSOC.  
261H ELECTRONIC COMPONENTS CONFERENCE 317-21 1976  
26-28 APRIL 1976 SAN FRANCISCO, CALIF., USA  
IEEE, NEW YORK, USA

THE USE OF THIN FILM PRECISION RESISTOR NETWORKS IN CHIP FORM IS INCREASING IN HYBRID CIRCUITS, PARTICULARLY IN DIGITAL-TO-ANALOG CONVERTERS, WHERE THEIR SUPERIOR TOLERANCES, TEMP. CO. TRACING AND SMALL SIZE MAKE POSSIBLE BETTER PERFORMANCE AT HIGHER PACKAGING DENSITIES. THE PERFORMANCE OF PRECISION THIN FILM CERMET RESISTORS AND NETWORKS AS USED IN THE CONVERTER IS COMPARED WITH THIN FILM AND IT IS SHOWN THAT THE CONVERTER IS LINEARITY OVER THE -55 DEGREES TO 125 FOR BETTER THAN 10 BIT. THIN FILM PERFORMANCE IS NECESSARY, DEPENDS ON TEMPERATURE SPAN, THIN FILM ASPECTS OF HYBRID DESIGN AND CHIP DESIGN ARE OUTLINED. SEVERAL HYBRID CONVERTERS ARE DISCUSSED TO ILLUSTRATE THE CHIP NETWORK ADVANTAGES. (5 Refs.)  
Descriptors: THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; DIGITAL-ANALOGUE CONVERSION RESISTOR NETWORKS; CHIP IDENTIFIERS; THIN FILM PRECISION RESISTOR NETWORKS; CHIP FORM; HYBRID CIRCUITS; DIGITAL ANALOGUE CONVERTORS  
Section Class Codes: B2540, B2524  
Unified Class Codes: SMEAAB, SMEAAG

957017 B7637727 ADVANCED MICROELECTRONIC PACKAGING CONCEPT  
KELFISER, F.Z.; HINMEL, R.P.; SCAPPLE, R.Y.  
HUGHES AIRCRAFT CO., CULVER CITY, CA, USA  
IEEE, ELECTRONIC INDUSTRIES ASSOC.  
26TH ELECTRONIC COMPONENTS CONFERENCE 292-9 1976  
26-28 APRIL 1976 SAN FRANCISCO, CALIF., USA  
IEEE, NEW YORK, USA

THE LARGE AREA HYBRID (LAH) IS A FULLY PROVEN MICROELECTRONIC PACKAGING CONCEPT WHICH EXTENDS CONVENTIONAL HYBRID TECHNOLOGY TO THE NEXT LEVEL OF ASSEMBLY - THE MODULE LEVEL. IT COMBINES THE DESIGN AND PACKAGING ADVANTAGES OF HYBRID MICROCIRCUITS AND PRINTED WIRING BOARDS. FEATURES OF LAH INCLUDE A LARGE CERAMIC SUBSTRATE (4.5CM<sup>2</sup> X 4.5CM<sup>2</sup> X 4SECONDS THICK FILM) TYPICALLY UPON WHICH RESISTORS AND MULTILAYER THICK FILM CONDUCTORS ARE DEPOSITED. DISCRETE PACKAGED COMPONENTS MAY BE ATTACHED AND INTERCONNECTED TO THIS CIRCUITRY. IN ADDITION, SELECTIVE AREAS OF THE SUBSTRATE MAY BE HERMETICALLY SEALED (BY A REPAIRABLE PROCESS) TO PROVIDE PROTECTION FOR SENSITIVE DEVICES AND WIRE BOND INTERCONNECTS. FINALLY, THE SUBSTRATE IS BONDED TO AN APPROPRIATE STRUCTURAL MEMBER AND INTERCONNECTED TO OUTSIDE CIRCUITRY BY MEANS OF A CONNECTOR, OR BY HAND WIRING. THIS PAPER DESCRIBES ADVANTAGES AND DISADVANTAGES OF LAH, AS WELL AS SOME OF THE PROBLEM AREAS EXPRESSED AND PHRASED IN DESIGN DEVELOPMENTS. ACHIEVED ENVIRONMENTAL TEST RESULTS ARE PRESENTED FOR DEVELOPMENTAL ENGINEERING MODELS.  
Descriptors: HYBRID INTEGRATED CIRCUITS; PACKAGING; MODULES; THICK FILM CIRCUITS  
Identifiers: LARGE AREA HYBRID; MICROELECTRONIC PACKAGING CONCEPT; LARGE CERAMIC SUBSTRATE; DISCRETE PACKAGED COMPONENTS; THICK FILM RESISTORS; THICK FILM CONDUCTORS  
Section Class Codes: B2540, B2522, B1266  
Unified Class Codes: SMEAAB, SMEAAG, ADGAAH

957016 87637726  
 SCREENING PROCEDURE FOR ADHESION DEGRADATION DUE TO SOLDER LEACHING IN THICK-FILM HYBRID MICRO CIRCUITS  
 LEVEN, S.S.  
 DEFENSE AND ELECTRONIC SYSTEMS CENTER, WESTINGHOUSE ELECTRIC CORP., BALTIMORE, MD., USA  
 I.E.E. ELECTRONIC INDUSTRIES ASSOC.  
 20TH ELECTRONIC COMPONENTS CONFERENCE 285-91 1976  
 21-22 April 1976 SAN FRANCISCO, CALIF., USA  
 I.E.E. NEW YORK, USA  
 DESCRIPTION: THE RESULTS OF AN EXPERIMENT TO DETERMINE PRACTICAL SCREENING AND QUALITY ASSURANCE PROCEDURES. FOUR ENVIRONMENTAL STRESSES WERE COMPARED TO DETERMINE WHICH ONE TO USE AS A QUALITY ASSURANCE TEST FOR ADHESION DEGRADATION. THE METHOD CONSISTED OF SOLDERING COPPER PINS TO CONDUCTOR PADS ON THE SUBSTRATE, AND THEN PULL-TESTING THE PINS TO THE DESTRUCTION OF THE CONDUCTOR/SUBSTRATE BONDS, BOTH BEFORE AND AFTER ENVIRONMENTAL STRESSES. THIS METHOD PROVIDES A MEASUREMENT OF BOTH TENSILE ADHESION BETWEEN THE SOLDERED CONDUCTOR AND THE SUBSTRATE, AND ADHESION DEGRADATION PROVIDED BY THE ENVIRONMENTAL STRESS. SEVEN THICK-FILM CONDUCTOR MATERIALS AND THREE SOLDER CONSTITUTIONS WERE USED, MAKING A TOTAL OF 21 CONDUCTOR/SOLDER SYSTEMS TESTED. ADHESION MEASUREMENTS WERE MADE IMMEDIATELY, AND ALSO AFTER EACH ENVIRONMENTAL CYCLE, AND PLOTTED. THE TEMPERATURE CYCLING STRESS APPEARS TO BE THE MOST PRACTICAL STRESS TO USE AS A SCREENING PROCEDURE FOR SOLDER LEACHING. GUIDELINES ARE PRESENTED FOR PERFORMING THE SCREENING TEST AND DETERMINING A RATING FOR ANY MATERIAL COMBINATION (7 R-15).

DESCRIPTIONS: THICK FILM CIRCUITS: HYBRID INTEGRATED CIRCUITS: INTEGRATED CIRCUIT TESTING: SOLDERING: QUALITY CONTROL: ADHESION: ENVIRONMENTAL TESTING  
 IDENTIFIERS: ADHESION DEGRADATION: SOLDER LEACHING: QUALITY ASSURANCE: ENVIRONMENTAL STRESSES: TENSILE ADHESION: TEMPERATURE CYCLING STRESS: SCREENING PROCEDURE  
 06  
 Section Class Codes: B2540, B2522, B1263  
 Unified Class Codes: SMEAB, SMCCAX, AOODA

957013 87637723  
 PERFORMANCE CHARACTERISTICS OF PLATINUM-SILVER CONDUCTOR MATERIALS IN HYBRID MICRO CIRCUITS  
 KHADAE, A.I.; KHADAE, S.  
 COMMUNICATIONS DIV., MOTOROLA INC., FORT LAUDERDALE, FL, USA  
 25TH ELECTRONIC COMPONENTS CONFERENCE 150-5 1976  
 I.E.E. NEW YORK, USA  
 DESCRIPTION: THE RELATIVE PERFORMANCE CHARACTERISTICS OF THICK FILM PLATINUM-SILVER CONDUCTOR MATERIALS FOR HYBRID MICRO ELECTRONIC APPLICATIONS ARE DESCRIBED. THE PERFORMANCE OF PLATINUM-SILVER

IS COMPARED TO THAT OF PALLADIUM-SILVER IN THE AREAS OF SOLDER PEEL STRENGTH, SOLDER LEACH RESISTANCE, SCREEN PRINTING BONDABILITY AND TEMPERATURE AGED PEEL STRENGTH. THE CHANGES IN METAL PERFORMANCE CHARACTERISTICS DUE TO THE INTERACTION WITH MULTILAYER DIELECTRICS ARE ALSO DISCUSSED. CAPACITORS MADE WITH VARIOUS METAL DIELECTRIC COMBINATIONS ARE DESCRIBED, AND THEIR QUALITY FACTORS COMPARED AT 1 MHZ AND 200 MHZ. THE DATA PRESENTED SHOW THAT NO SINGLE PLATINUM-SILVER IS SUPERIOR IN ALL AREAS TESTED; HOWEVER, SOME METAL-GLASS COMBINATIONS HAVE BETTER ELECTRICAL PROPERTIES THAN OTHERS (7 Refs.)  
 DESCRIPTORS: THICK FILMS: HYBRID MICRO CIRCUITS: HYBRID FILM DEVICES  
 IDENTIFIERS: HYBRID MICRO CIRCUITS: SOLDER PEEL STRENGTH: SOLDER LEACH RESISTANCE: SCREEN PRINTING CHARACTERISTICS: FILM RESISTIVITY: ALUMINUM ULTRASONIC WIRE BONDABILITY: FILM TEMPERATURE AGED PEEL STRENGTH: MULTILAYER DIELECTRICS: METAL DIELECTRIC COMBINATIONS: Pt-AG CONDUCTOR MATERIALS: THICK FILM  
 06  
 Section Class Codes: B2540, B2522, B2570  
 Unified Class Codes: SMEAB, SMCCAX, SHMAAR

957012 87637722  
 ULTRASONIC BONDABILITY OF PLATINUM-SILVER CONDUCTORS IN HYBRID MICRO CIRCUITS  
 KHADAE, S.; BULL, D.N.  
 COMMUNICATIONS DIV., MOTOROLA INC., FORT LAUDERDALE, FL, USA  
 I.E.E. ELECTRONIC INDUSTRIES ASSOC.  
 26TH ELECTRONIC COMPONENTS CONFERENCE 86-91 1976  
 I.E.E. NEW YORK, USA  
 DESCRIPTION: THE ULTRASONIC BONDING CHARACTERISTICS OF PLATINUM-SILVER CONDUCTOR MATERIALS ARE DESCRIBED. ONE MIL AL (1 PERCENT Si) WIRE WAS ULTRASONICALLY BONDED TO FIVE DIFFERENT Pt-AG CONDUCTOR MATERIALS PRINTED AND GOLD CONDUCTOR MATERIALS WERE ALSO USED AS TEST VEHICLES FOR COMPARISON PURPOSES. BOND PULL STRENGTH DATA ARE PRESENTED FOR EACH MATERIAL AT 0, 10H, 500, AND 1000 HOURS OF AGING AT 150 DEGREE LSC. THE DEGRADATION IN EACH MATERIAL FOR 1H, 500, AND 1000 HOURS, THE DATA SHOW THAT BOTH Pt-AG AND Au IN BOND STRENGTH RETENTION AFTER 1000 HOURS OF AGING AT 150 DEGREE LSC (9 Refs.)  
 DESCRIPTORS: INTEGRATED CIRCUIT PRODUCTION: METALLISATION: HYBRID INTEGRATED CIRCUITS: HYBRID MICRO CIRCUITS: ULTRASONIC BONDING  
 IDENTIFIERS: HYBRID MICRO CIRCUITS: ULTRASONIC BONDING  
 CHARACTERISTICS: Pt-AG CONDUCTORS  
 06  
 Section Class Codes: B2540, B2560  
 Unified Class Codes: SMEAB, SMCCAX

95011 87637720 PHYSICAL DEFECTS IN THICK-FILM HYBRID SUBSTRATES

FRITZ, L.L.  
WESTERN DIV., GTE-SYLVANIA INC., MOUNTAIN VIEW, CA, USA  
IEEE, ELECTRONIC INDUSTRIES ASSOC.  
26-11H ELECTRONIC COMPONENTS CONFERENCE 32-54 1976  
26-28 APRIL 1976 SAN FRANCISCO, CALIF., USA

IEEE, NEW YORK, USA  
DISCUSSES INSPECTION CRITERIA FOR MANUFACTURING THICK-FILM SUBSTRATES TO HIGH-RELIABILITY STANDARDS AND PHOTOGRAPHICALLY ILLUSTRATES DEFECTS THAT WERE ENCOUNTERED. PROGRAM STARTUP INCLUDED MOVING INTO A NEW CLEAN ROOM FACILITY, TRAINING OF OPERATORS, SPECIFICATION GENERATION AND DOCUMENTATION PROCEDURES. A MONITOR/ED-LINE CONCEPT WAS USED WITH RELIABILITY AND QUALITY ASSURANCE PERSONNEL OPERATING THE MONITORING FUNCTION. (7 Refs)  
Designators: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS  
1: INSPECTION; QUALITY CONTROL  
1: Inspection; Inspection Criteria; Reliability; Quality Assurance; Monitoring; Thick Film Hybrid Integrated Circuits  
Or: Section Class Codes: B2540, B2522, B1263  
Unified Class Codes: SMEAAB, SMECAA, AODAAL

957008 87637717 PRODUCTION COATING OF VIAS IN ALUMINA SUBSTRATES WITH VACUUM EVAPORATED CHROMIUM AND GOLD

LOSSER, J.A.

BENDIX CORP., KANSAS CITY, MO, USA  
IEEE, ELECTRONIC INDUSTRIES ASSOC.  
26-11H ELECTRONIC COMPONENTS CONFERENCE 1-8 1976  
26-28 APRIL 1976 SAN FRANCISCO, CALIF., USA

IEEE, NEW YORK, USA  
DESIGN OF A PRODUCTION VACUUM DEPOSITION FIXTURE FOR COATING 3.75 INCH BY 4.50 INCH (95 BY 114 MM) ALUMINA SUBSTRATES WITH 50 MM OF CHROMIUM AND 6 MM OF GOLD PRESENTED CHALLENGES IN MEETING GEOMETRY, MECHANICAL, AND COST CONSTRAINTS. THE COATED SUBSTRATES HAD TO MEET UNIQUE REQUIREMENTS FOR VIA RESISTANCE, THICKNESS UNIFORMITY, AND BACKSIDE METALLIZATION ON HYBRID MICROCIRCUITS. A STUDY OF FIXTURE GEOMETRY VERSUS THE REQUIRED FILM CHARACTERISTICS RESULTED IN THE DESIGN OF A FIXTURE WHICH ROTATES THE SUBSTRATES 360 DEGREES ABOUT THEIR LONG AXIS WHILE SIMULTANEOUSLY ROTATING THEM ABOUT THE DEPOSITION SOURCE IN A PHASED CYCLOID MOTION.  
Designators: INTEGRATED CIRCUIT PRODUCTION; VAPOUR DEPOSITION; HYBRID INTEGRATED CIRCUITS; SUBSTRATES; METALLISATION  
Identifiers: ALUMINA SUBSTRATES; PRODUCTION VACUUM DEPOSITION FIXTURE; RESISTANCE; THICKNESS UNIFORMITY; HYBRID MICROCIRCUITS; FILM CHARACTERISTICS; PHASED CYCLOID MOTION; PRODUCTION COATING; AU COATING; CR COATING; BACKSIDE METALLISATION

957010 87637719 MANUFACTURING PROCESSES FOR HYBRID MICROCIRCUITS CONTAINING VIAS

REED, D.; LAUDER, A.; DLESSNER, P.  
BENDIX CORP., KANSAS CITY, MO, USA  
IEEE, ELECTRONIC INDUSTRIES ASSOC.  
26-11H ELECTRONIC COMPONENTS CONFERENCE 18-31 1976  
26-28 APRIL 1976 SAN FRANCISCO, CALIF., USA

IEEE, NEW YORK, USA  
HYBRID MICROCIRCUITS DESIGNED FOR ERDA BY SANDIA LABORATORIES REQUIRE METALLIZED VIAS TO INTERCONNECT FRONTSIDE TANTALUM NITIDE, CHROMIUM-GOLD THIN-FILM NETWORKS WITH METALLIZED BACKSIDE GROUND PLANES ON 3.75 INCH (95.2 MM) BY 4.5 INCH (114 MM) ALUMINA SUBSTRATES. MANUFACTURING PROCESSES WERE DEVELOPED FOR DRILLING, HOLE FORMING, AND METALLIZING Holes IN ALUMINA SUBSTRATES. METALLIZING SUBSTRATES ON BOTH SIDES AND THROUGH VIAS, DRY FILM PHOTOLITHOGRAPHY, & MM THICK GOLD TO 5 MIL (127 MM) LINE WIDTHS AND SPACING, AND DETERMINING VIA QUALITY AND ACCURACY. (4 Refs)  
Designators: INTEGRATED CIRCUIT PRODUCTION; HYBRID INTEGRATED CIRCUITS; METALLISATION; SUBSTRATES; METALLIZERS; BACKSIDE GROUND PLANES; ALUMINA SUBSTRATES; DRY FILM PHOTOLITHOGRAPHY; A; CR THIN FILM NETWORK; METALLISED VIAS  
Or: Section Class Codes: B2540  
Unified Class Codes: SMEAAB



956070 B7637659  
LOW-COST PRECISION RESISTOR NETWORKS

COLLINS, F.M.  
DEPT. OF SPECIAL COMPONENTS, AIRCO ELECTRONICS, NIAGARA FALLS, NY, USA  
IEEE, ELECTRONIC INDUSTRIES ASSOC.  
21st ELECTRONIC COMPONENTS CONFERENCE, 313-16  
20-28 APRIL 1976 SAN FRANCISCO, CALIF., USA

1976  
LIFE, NEW YORK, USA  
DESCRIBES THE PRODUCTION OF THIN FILM RESISTOR NETWORKS USING TANTALUM BASED FILMS ON FINE GRAINED CERAMIC SUBSTRATES. CIRCUIT PATTERNS ARE GENERATED BY SUBTRACTIVE ETCHING AND ARE LASER TRIMMED. EXTERNAL LEADS ARE PROVIDED BY THE MICROCOMPRESSION BONDING OF RIBBON LEADS. PACKAGING IS COMPLETED WITH A TOP CERAMIC COVER.  
DISCUSSION: THIN FILM CIRCUITS; PACKAGING: INTEGRATED CIRCUIT PRODUCTION  
1-BIT/LIFERS; PRECISION RESISTOR NETWORKS: THIN FILM RESISTOR NETWORKS; TANTALUM BASED FILMS; FINE GRAINED CERAMIC SUBSTRATES; SUBTRACTIVE ETCHING; THERMOCOMPRESSSION BONDING; RIBBON LEADS; TOP CERAMIC COVER; PACKAGING; EXTERNAL LEADS; LASER TRIMMING

06  
Section Class Codes: B2524, B1266  
Unified Class Codes: SMCEAH, ADGHAH

956169 B7637658  
THE EFFECTS OF GOLD AND NICKEL PLATING THICKNESSES ON THE STRENGTH AND RELIABILITY OF THERMOCOMPRESSSION BONDED EXTERNAL LEADS

PANOURIS, N.I.; HALL, P.M.  
BELL TELEPHONE LABS, INC., ALLENTHOWN, PA, USA  
I.E.E. ELECTRONIC INDUSTRIES ASSOC.  
21st ELECTRONIC COMPONENTS CONFERENCE, 74-9  
20-28 APRIL 1976 SAN FRANCISCO, CALIF., USA

1976  
LIFE, NEW YORK, USA  
DISCUSSION: THIN FILM CIRCUITS ARE TYPICALLY Cu-BASED TO A-FIN TALLIED THIN FILM CIRCUITS. THIS WORK WAS AN EVALUATION OF THE Ni/AU SYSTEM. ALL LEADS PLATED WITH Au ON A COMBINATION OF Ni AND Au. THE OBJECTIVE OF THIS WORK WAS AN EVALUATION OF THE Ni/AU SYSTEM TO DETERMINE THE OPTIMUM PLATING THICKNESSES FOR RELIABLE TC BONDING. ALSO INVESTIGATED WAS THE MINIMUM Au THICKNESSES NECESSARY FOR TC BONDING WHEN THE Ni DIFFUSION BARRIER WAS OMITTED. FOUR CRITERIA WERE EVALUATED: INITIAL BONDABILITY; BOND STRENGTH AFTER ACCELERATED AGING; SUSCEPTIBILITY TO CRACKING IN A 90 DEGREE BEND TEST; AND FATIGUE BEHAVIOR. THE TEST VEHICLE WAS A 32-LEAD DUAL-IN-LINE PACKAGE UTILIZING ALUMINA SUBSTRATES METALLIZED WITH Ti/Pt/Au FILMS AND Cu LEAD FRAMES (CDA 102 AND 110) ELECTROPLATED WITH Ni AND Au IN THE RATIO'S OF 0 TO 41 NM AND 0.4 TO 20 NM RESPECTIVELY (0 TO 10,000 AND 15 TO 780 MICROINCHES (MILS) RESPECTIVELY (0 MILS) DISCUSSIONS: THIN FILM CIRCUITS; WELDING: RELIABILITY; MECHANICAL STRENGTH  
For references, strength, reliability, thermocompression bonded

EXTERNAL LEADS; THIN FILM CIRCUITS; OPTIMUM PLATING THICKNESSES; INITIAL BONDABILITY; BOND STRENGTH; CRACKING; BEND TEST; AU; Ni; PLATING THICKNESS EFFECTS

06

Section Class Codes: B2524, B2560

Unified Class Codes: SMCEAH, SMGAAH

956067 A7672678, B7637656  
CHARACTERISTICS OF POLYCRYSTALLINE SILICON INTEGRATED CIRCUITS

GOROVOV, V.A.; MATSON, E.A.; POLYAKOV, C.A.

VZLIS, MOSCOW, USSR

THIN SOLID FILMS (SWITZERLAND) VOL. 35, NO. 2 149-53 15  
JUNE 1976 Coden: THSFAP

THE INTERRELATION OF THE MICROSTRUCTURE, MORPHOLOGY AND ELECTRICAL PROPERTIES OF POLYCRYSTALLINE SILICON THIN FILMS GROWN ON NON-ORIENTED INSULATING SUBSTRATES BY CATHODE GUNIER SPUTTERING AND BY CHEMICAL VAPOR DEPOSITION AND ALSO THE CHARACTERISTICS OF INTEGRATED CIRCUIT ELEMENTS SUCH AS RESISTORS, DIODES, JFETS, AND MOSFETS, FABRICATED FROM THESE FILMS BY PLATING TECHNOLOGY, HAVE BEEN INVESTIGATED. THE ELECTRONIC PROPERTIES OF THESE FILMS ARE INFERRED IN TERMS OF A MODEL WHICH TAKES INTO ACCOUNT BOTH THE CRYSTALLITE BOUNDARIES AND VOLUME PROPERTIES. IT WAS FOUND THAT INTEGRATED CIRCUITS FABRICATED FROM POLYCRYSTALLINE SILICON FILMS BY PLANAR TECHNOLOGY HAVE SEVERAL ADVANTAGES OVER MONOCRISTALLINE SILICON ONES AND POSSIBLE APPLICATIONS ARE DISCUSSED (14 Refs.)

Descriptors: SILICON; SEMICONDUCTOR THIN FILMS; ELEMENTAL SEMICONDUCTORS; THIN FILM CIRCUITS; THIN FILM DEVICES  
Technifiers: MICROSTRUCTURE; MORPHOLOGY; ELECTROPHYSICAL PROPERTIES; CATHODE GUNIER SPUTTERING; CHEMICAL VAPOR DEPOSITION; RESISTORS; DIODES; JFETS; MOSFETS; PLANAR TECHNOLOGY; ELECTRONIC PROPERTIES; POLYCRYSTALLINE Si ICs  
02  
Section Class Codes: A034, A7000, B524, A911B, B7420  
Unified Class Codes: RGGEAP, NVAAK, SMCEAH, ZGKAK

956006 87637655 BATCH BONDED CROSSOVERS FOR THIN FILM CIRCUITS. I.

DEVELOPMENT: DILED, D.A.  
EINING, J.A.; DILED, D.A.  
SOLID STATE TECHNOL. (USA) VOL.19, NO.7 26-31, 44 JULY  
1976 COMM: STEAP  
FOR MORE EFFICIENT UTILIZATION OF THE SUBSTRATE AREA OF A  
THIN FILM INTEGRATED CIRCUIT, A CONDUCTOR MAY SWAY, OR PASS  
ACROSS ANOTHER CONDUCTOR BY MEANS OF A 'CROSSOVER', THAT  
PHYSICALLY SEPARATES, AND ELECTRICALLY ISOLATES THE SPANNING  
CONDUCTOR, AND THE UNDERLYING CONDUCTOR, IN THE BATCH WOUNDING  
PRO.157, THAT WAS DEVELOPED FOR INCORPORATING THESE NEW  
CROSSOVERS WITHIN THIN FILM CIRCUITS. THE CROSSOVERS ARE  
GENERATED INDEPENDENTLY OF THE PRODUCTION OF THE CERAMIC  
SUBSTRATES, AND THEIR CIRCUIT PATTERNS. THIS SEPARATE, PARALLEL  
PRODUCTION ARRANGEMENT HAS RESULTED IN IMPROVED CROSSOVER TEST  
YIELDS, LESS HANDLING DAMAGE TO COMPLETED CIRCUIT PATTERNS  
(REDUCING SIGNIFICANTLY PRODUCT YIELD ADVANTAGES), SHORTER  
TURNAROUND TIME, AND REDUCED IN-PROCESS INVENTORY-ALL OF WHICH  
HAVE CONTRIBUTED TO REDUCING THE COST OF HYBRID INTEGRATED  
CIRCUITS FOR ELECTRONIC SWITCHING SYSTEMS.  
DISCLOSORS: INTEGRATED CIRCUIT PRODUCTION: THIN FILM  
CIRCUITS  
Inventors: THIN FILM CIRCUITS: INTEGRATED CIRCUIT: BATCH  
BONDED CROSSOVERS  
02  
Section Class Codes: B2521, B2560  
Unified Class Codes: SMCEAH, SMGAA

Unified Class Codes: SMCCAX, ETEAAD, SMEAAB

956061 87637650 GLASS PASSIVATED THICK FILM CAPACITORS FOR RC CIRCUITS

BRATSCH, W.R.  
ZENITH RADIO CORP., ELM GROVE VILLAGE, IL, USA  
IEEE, ELECTRONIC INDUSTRIES ASSOC.  
26TH ELECTRONIC COMPONENTS CONFERENCE 304-12 1976  
26-28 APRIL 1976 SAN FRANCISCO, CALIF., USA  
IEEE, NEW YORK, USA  
THICK FILM CAPACITORS OFFER A HIGH UNIT CAPACITANCE FOR A  
FILM TECHNOLOGY, INCREASED HYBRID DESIGN CAPABILITY, A  
POTENTIAL INCREASE IN RELIABILITY AND COST ADVANTAGES. THEIR  
DISADVANTAGES INCLUDE: POOR PHYSICAL PROPERTIES, LIMITED  
ELECTRICAL PROPERTIES, DIFFICULT DEVELOPMENTAL WORK AND  
COMPLEX PROCESSING. A GLASS FILM PASSIVATION SYSTEM MAY BE  
USED TO IMPROVE THE PROPERTIES OF HM THICK FILM CAPACITORS  
AND ENABLE THE DEVELOPMENT OF LOW COST RC NETWORKS. SUCH  
NETWORKS CAN BE ECONOMICALLY MADE IF THE FOLLOWING ARE DONE:  
USE MULTIPLE CIRCUIT FUNCTIONS IN THE DESIGN; USE LOW COST,  
PROCESS-INSENSITIVE MATERIALS; USE HIGH CIRCUIT DENSITY AND  
MAKE MANY SCREENED COMPONENTS PER PROCESSING OPERATION; USE  
AUTOMATED, LOW COST PROCESSING OPERATIONS; AVOID HERMETIC  
PACKAGING; AND ACHIEVE HIGH YIELDS (12 Refs)

Identifiers: RC CIRCUITS; PASSIVATION; GLASS FILM PASSIVATION SYSTEM; THICK FILM CAPACITORS

06

Section Class Codes: B2522

Unified Class Codes: SMCCAX

956112 87637651 MICROWAVE APPLICATIONS OF THICK-FILM TECHNOLOGY

ALLEN, J.L.  
ELECTRICAL AND ELECTRONIC SYSTEMS DEPT., UNIV. OF SOUTH  
FLORIDA, TAMPA, FL, USA  
IEEE  
PROCEEDINGS OF THE 1976 IEEE SOUTHEASTCON REGION 3  
CONFERENCE ON ENGINEERING IN A CHANGING ECONOMY 219-20  
1976  
5-7 APRIL 1976 CLEMSON, S.C., USA

A TUTORIAL REVIEW IS PRESENTED DESCRIBING CONSTRAINTS  
IMPOSED ON THE UTILIZATION OF THICK-FILM TECHNOLOGY AT  
MICROWAVE FREQUENCIES. POTENTIAL ADVANTAGES OF FRITLESS  
(REACTIVELY-BONDED) THICK-FILM INKS FOR MICROWAVE APPLICATIONS  
ARE DISCUSSED. EMPHASIS IS ON TECHNIQUES AND MATERIALS LIKELY  
TO LEAD TO IMPROVED HIGH FREQUENCY PERFORMANCE (6 Refs)  
DISCLOSORS: MICROWAVE INTEGRATED CIRCUITS; THICK FILM  
CIRCUITS

Inventors: TUTORIAL REVIEW: INKS: MICROWAVE APPLICATIONS;  
TECHNIQUES; MATERIALS; HIGH FREQUENCY PERFORMANCE; THICK FILM  
TECHNOLOGY  
01  
Section Class Codes: B2522, B1020, B2549

956058 B7637047  
 PARALLEL GAP WELDING TO THICK FILM METALLIZATION  
 JOHNSON, D.R.; ANNUTON, R.E.  
 HYBRID MICROCIRCUIT TECHNOLOGY, SANDIA LABS., ALBUQUERQUE, NM.  
 USA

IEEE, ELECTRONIC INDUSTRIES ASSOC.  
 26TH ELECTRONIC COMPONENTS CONFERENCE, 66-73 1976  
 26-28 APRIL 1976 SAN FRANCISCO, CALIF., USA

IEEE NEW YORK, USA  
 THIS STUDY WAS DIRECTED AT THE PARALLEL GAP WELDING RESPONSE  
 OF A SERIES OF GOLD AND PLATINUM-GOLD THICK FILM CONDUCTOR  
 MATERIALS, WHICH WERE SUBJECTED TO VARIOUS PEAK  
 TEMPERATURE, BRIEF SPEED FIRING PROFILES. THE PARALLEL GAP  
 WELDING WAS CONDUCTED USING A VARIETY OF WELD VOLTAGE/PULSE  
 DURATION SETTINGS AND A NOMINAL 0.05 MILLIMETER THICK BY 0.38  
 MILLIMETER WIDE PURE GOLD WIDENON. EVALUATION OF THE WELDS WAS  
 DETERMINED THROUGH A 90 DEGREES PEEL TEST (12 Rev's)  
 Describers: THICK FILM CIRCUITS; RESISTANCE WELDING;  
 Identifiers: THICK FILM CONDUCTOR MATERIALS; PEAK  
 TEMPERATURE/BRIEF SPEED FIRING PROFILES; WELD VOLTAGE/PULSE  
 DURATION SETTINGS; PARALLEL GAP WELDING; AU; THICK FILM  
 METALLIZATION; PT/AU  
 06  
 Section Class Codes: B2522, B2560  
 Unified Class Codes: SMCEAH, SNGAAR

02  
 Section Class Codes: B1820, B2524, B2540  
 Unified Class Codes: ETEAAD, SMCEAH, SMEAAB  
 Language: FRENCH

CONSTRUCTION AND APPLICATIONS (78 Refs)  
 Describers: POWER AMPLIFIERS; POWER CONVERTORS; THIN FILM  
 CIRCUITS; THICK FILM CIRCUITS  
 Identifiers: POWER AMPLIFIERS; POWER CONVERTORS; THICK FILM  
 CIRCUITS; THIN FILM CIRCUITS  
 02  
 Section Class Codes: B1040, B1830, B2522, B2524  
 Unified Class Codes: ETIAB, ETGAT, SMCEAH, SNGAAR

956455 B7637009  
 A GENERAL SKETCH OF MICROWAVE INTEGRATED CIRCUITS  
 DE BLOCK, M.  
 NELF, BRIELLES, BELGIUM  
 REV. HF (BELGIUM) VOL.10. NO.2 39-45 1976 Coden:  
 RVU1AF  
 SOME DOZEN PASSIVE AND ACTIVE COMPONENTS, IN THIN FILM  
 TECHNOLOGY, DEVELOPED SINCE 1970 FOR THE L AND X MICROWAVE  
 BANDS, ARE BRIEFLY DESCRIBED (6 Refs)  
 Describers: MICROWAVE INTEGRATED CIRCUITS; THIN FILM  
 CIRCUITS  
 Identifiers: MICROWAVE INTEGRATED CIRCUITS; THIN FILM  
 L-BAND; X-BAND  
 02  
 Section Class Codes: B1820, B2524, B2540  
 Unified Class Codes: ETEAAD, SMCEAH, SMEAAB  
 Language: FRENCH

956570 B7637185  
 THIN FILM DELAY LINE DEVICE  
 NISHI, T.; IKUTA, H.  
 RIS, LAB., SONYU INDUSTRIAL CO. LTD., KYOTO, JAPAN  
 IEEE, ELECTRONIC INDUSTRIES ASSOC.  
 26TH ELECTRONIC COMPONENTS CONFERENCE, 199-202 1976  
 26-28 APRIL 1976 SAN FRANCISCO, CALIF., USA  
 IEEE NEW YORK, USA  
 INVESTIGATES A NEW DEVICE CONSISTING OF A DISTRIBUTED LC  
 NETWORK WHICH USES THIN FILM TECHNOLOGY (4 Refs)  
 Describers: DELAY LINES; THIN FILM CIRCUITS; DISTRIBUTED  
 PARAMETER NETWORKS  
 Identifiers: DISTRIBUTED LC NETWORK; THIN FILM TECHNOLOGY;  
 THIN FILM DELAY LINE  
 02  
 Section Class Codes: B1870, B2524  
 Unified Class Codes: ETNAAP, SMCEAH

956501 B7637071  
 THICK AND THIN FILMS IN POWER AMPLIFIERS AND CONVERTERS  
 HART, P.J.  
 BICKNELL INSTRUMENTS LTD., GLENROTHES, SCOTLAND  
 NEW ELECTRON, (GB) VOL. 9, NO. 13 78-90-1 29 JUNE 1976  
 Coden: HNLAC  
 DISCUSSES THICK AND THIN FILM POWER CIRCUITS. THEIR

956352 87636587  
HERMETICITY OF POLYMERIC LID SEALANTS  
TRAGER, R.M.  
SANDIA LABS., ALBUQUERQUE, NM, USA  
IEE, ELECTRONIC INDUSTRIES ASSOC.  
26TH ELECTRONIC COMPONENTS CONFERENCE, 361-7  
26-29 APRIL 1976 SAN FRANCISCO, CALIF., USA  
IEE, NEW YORK, USA

ORGANIC ADHESIVES ARE USEFUL LID SEALANTS BECAUSE THEY ARE  
PROCESSED AT LOW TEMPERATURES, ARE INEXPENSIVE, AND ARE EASY  
TO WORK. HOWEVER, THERE HAS BEEN RECENT CONCERN ABOUT THE  
DEGREE OF PROTECTION ORGANICS CAN PROVIDE MOISTURE SENSITIVE  
COMPONENTS. DATA PRESENTED IN THIS PAPER SHOWS ORGANIC  
ADHESIVES CAN SEAL PACKAGES WHICH PASS GROSS AND FINE LEAK  
TESTS, BUT ALLOW WATER VAPOR TO PERMEATE RAPIDLY. PERFORATION  
PARAMETERS OF 3-7 x 10<sup>-11</sup> G/CMS-TORR. THESE  
PERMITTANCES AGREE WITH THOSE LISTED FOR EPOXIES. IN THE  
LITERATURE, WITH THIS PERMEABILITY RANGE AND THE PACKAGE  
CONFIGURATION USED IN THIS STUDY, THE INFERIOR OF A PACKAGE  
WILL REACH 50 PERCENT OF THE EXTERIOR HUMIDITY IN 6-10 HOURS  
(15 REF.)

De-Comments: HYBRID INTEGRATED CIRCUITS; SEALS (STOPPERS);  
Tighteners; POLYMERIC LID SEALANTS; MOISTURE SENSITIVE  
COMPONENTS; HYBRID MICROCIRCUIT PACKAGES; SEAL PERMEABILITIES;  
HERMETIC PACKAGING  
Qs:

Section Class Codes: B1166, B240  
Unified Class Codes: ADGHAH, SMEAB

949337 87632587, C7622162  
MANUFACTURE-PRODUCT TUNING OF HYBRID THIN-FILM FILTERS

LOEGER, E.; WALEK, G.  
BELL LABS., MOLMEL, NJ, USA

111 THAIS, CIRCUITS AND SYST. (USA) VOL.CAS-23, NO.7

461-6, JULY 1971. Coden: ICSBT

TO ACHIEVE HIGHLY ACCURATE FILTER CHARACTERISTICS IN HYBRID  
INTEGRATED ACTIVE FILTER CIRCUITS, A NEW TUNING PROCEDURE FOR  
SALVATION-KEY TYPE HYBRID FILTERS, HAS BEEN DEVELOPED AND  
IMPLEMENTED. THE PROPOSED TUNING PROCEDURE TAKES INTO ACCOUNT  
THE LENS FACTOR OF THIN-FILM CAPACITORS AND NONIDEAL  
AMPLIFIERS. AN EXAMPLE THAT DESCRIBES THE TUNING PROCEDURE IN  
DETAIL IS PRESENTED FOR A SECOND ORDER LOW PASS FILTER. IT IS  
ALSO APPLICABLE IN THE SAME MANNER TO ALL SECOND-ORDER  
FUNCTIONS, WITH THE AID OF A COMPUTER. THE PROCEDURE HAS BEEN  
COST-LETTING AUTOMATED; IT IS THEREFORE WELL SUITED FOR  
PRODUCTION IN MANUFACTURE. IT IS BEING USED IN ON LINE  
PRODUCTION OF THIN-FILM ACTIVE FILTERS (6 Rev/s)

De-Comments: ACTIVE FILTERS; HYBRID INTEGRATED CIRCUITS;  
TUNING; THIN FILM CIRCUITS;  
Computers; HIGHLY ACCURATE FILTER CHARACTERISTICS; HYBRID  
INTEGRATED ACTIVE FILTER CIRCUITS; TUNING PROCEDURE; LOSS

FACTOR; THIN-FILM CAPACITORS; NONIDEAL AMPLIFIERS; SECOND  
ORDER LOW PASS FILTER; COMPUTER; COMPLETELY AUTOMATED; ON LINE  
PRODUCTION; SALEN AND KEY FILTERS; TUNING BY MEASURE PREDICT  
METHOD  
02

Section Class Codes: B1880, B2540, B2524, CBB42  
Unified Class Codes: ETRAAM, SMEAB, SMEAH, WMEAQ

947052 87636241  
INTEGRATED CIRCUIT INSTRUMENTATION FOR VEHICLES  
GOSS, A.P.  
SMITHS INDUSTRIES LTD., LONDON, ENGLAND  
IEE, IEE, INST., MECH. ENGRS., SOC. AUTOMOTIVE ENGRS  
SIN 0 B3296 162 6  
1976 INTERNATIONAL CONFERENCE ON AUTOMOBILE ELECTRONICS 75-8

6-9 JULY 1976 LONDON, ENGLAND

IEE, LONDON, ENGLAND  
DESPITE THE PRESENT NATURAL RELUCTANCE OF THE MOTOR INDUSTRY  
TO ACCEPT ELECTRONICS, VEHICLE INSTRUMENTATION HAS BEEN ONE  
AREA WHERE INTEGRATED CIRCUITS (IC) HAVE BEEN ACCEPTED AND ARE  
NOW BEING USED IN LARGE QUANTITIES. THIS HAS BEEN BROUGHT  
ABOUT MAINLY BY THE NEED TO REDUCE THE COMPLEXITY OF  
MANUFACTURE AND THUS REDUCE COSTS. AT THE SAME TIME TO IMPROVE  
ACCURACY AND GENERAL SPECIFICATION OF INSTRUMENTATION. VARIOUS  
WAYS OF DOING THIS HAVE BEEN TRIED IN THE PAST, PARTICULARLY  
USING OFF-THE-SHELF IC IN CONJUNCTION WITH OTHER  
SEMICONDUCTORS AND PASSIVE COMPONENTS MOUNTED ON PC BOARDS.  
WHILE THIS ACHIEVES THE OBJECTIVES OF IMPROVED PERFORMANCE, IT  
FALLS SHORT OF THE DEAL OF MINIMUM NUMBER OF PIECE PARTS AND  
HENCE MINIMUM ASSEMBLY TIME, AND DOES NOT GIVE LOWEST COST.  
CUSTOM DESIGNED IC SATISFY ALL THESE CRITERIA AND WHEN  
COUPLED WITH THICK FILM CIRCUITS CAN DRAMATICALLY REDUCE PIECE  
PARTS AND IMPROVE RELIABILITY

De-Comments: MONOLITHIC INTEGRATED CIRCUITS; ROAD VEHICLES;  
TACHOMETERS; INTEGRATED CIRCUITS;  
Identifiers: VEHICLE INSTRUMENTATION; INTEGRATED CIRCUITS;  
THICK FILM CIRCUITS; RELIABILITY; IC INSTRUMENTATION  
06  
Section Class Codes: B5620, B2528, B4210  
Unified Class Codes: TKEAR, SMEAK, BECCAB

945115 87634875  
 MICROWAVE FREQUENCY COUNTER  
 MICROWAVE J. (USA) VOL.19, NO.4 33 APRIL 1976 Coden:  
 MCWAL  
 THE MODEL 6054B AUTOMATIC MICROWAVE FREQUENCY COUNTER IS  
 DESIGNED FOR MEASUREMENTS FROM 20 MHZ TO 24 GHZ. THE COUNTER IS  
 INCORPORATES SUCH INNOVATIONS AS A NEW INPUT SAMPLER USING  
 THIN FILM CIRCUITRY AND THE FREQUENCY LOCK AUTOMATIC COMPUTING  
 TRANSFER OSCILLATOR MEASURING TECHNIQUE.  
 Descriptrors: FREQUENCY MEASUREMENT; MICROWAVE MEASUREMENT;  
 COUNTERS; THIN FILM CIRCUITS; AUTOMATIC TEST EQUIPMENT;  
 Identifiers: AUTOMATIC MICROWAVE FREQUENCY COUNTER; 20 MHZ  
 TO 24 GHZ; INPUT SAMPLER; THIN FILM CIRCUITRY; FREQUENCY LOCK  
 AUTOMATIC COMPUTING TRANSFER OSCILLATOR  
 02  
 Section Class Codes: B4270, B4324, B4425  
 Unified Class Codes: BECRAX, BCKAZ, BCKMAK

945116 87634667  
 PRE-IF AMPLIFIER, A MAIN IF AMPLIFIER AND A POST-IF AMPLIFIER  
 TO PROVIDE BROADER BANDWIDTH. THIS PAPER DESCRIBES DESIGN  
 CONCENTRATIONS AND PERFORMANCE OF EACH AMPLIFIER, AS WELL AS  
 GENERAL DESIGN CONSIDERATIONS. ALL 1.7 GHZ CIRCUITS ARE  
 CONSTRUCTED ON ALUMINA CERAMIC SUBSTRATES UTILIZING HYBRID IC  
 TECHNOLOGY AND THIN FILM TECHNOLOGY. (11 Refs.)

Descriptrors: MICROWAVE AMPLIFIERS; INTERMEDIATE-FREQUENCY  
 AMPLIFIERS; WIDEBAND AMPLIFIERS; SOLID-STATE MICROWAVE

CIRCUITS; HYBRID INTEGRATED CIRCUITS; MICROWAVE LINKS; THIN

FILM CIRCUITS; MICROWAVE INTEGRATED CIRCUITS

Identifiers: 1.7 GHZ IF AMPLIFIERS; MAIN IF AMPLIFIER; WIDE

AUTOMATIC GAIN CONTROL RANGE; HYBRID IC TECHNOLOGY; THIN FILM

TECHNOLOGY; AL/SUB 3/D/SUB 3/; MICROWAVE AMPLIFIERS; LOW NOISE

PRE IF AMPLIFIER; POST IF AMPLIFIER; GUIDED MICROWAVE SYSTEMS;

MICROWAVE COMMUNICATION SYSTEMS; MILLIMETRE WAVE COMMUNICATION

02

Section Class Codes: B3565, B1820, B2540, B3561, B1840

Unified Class Codes: FEKMAK, EFEAAD, SMEAAB, FERCAL, EMAAB

945118 87634667  
 COMPACT COLOR CAMERAS HIGHLY PROMISING FOR NEWS REPORTING  
 JIE (JAPAN) NO.112 34 APRIL 1976 Coden: JELEBR  
 THE THIN FILM HYBRID LSI SYSTEM AMPLIFIER FOR COLOR CAMERA  
 USE IS NO MORE THAN ONE-SIXTH THE SIZE OF A CONVENTIONAL  
 STUDIO CAMERA AMPLIFIER. THE MATERIALS USED ARE ALSO LIGHTER  
 THAN THE CONVENTIONAL ONES. THUS ATTACKING MINIATURIZATION  
 POSSIBILITY OF COLOR CAMERAS USING SOLID-STATE IMAGE PICKUP  
 DEVICES INSTEAD OF TUBES. COLOR REPRODUCTION AND SENSITIVITY  
 HAVE NOT YET GROWN OUT OF THE RUDIMENTARY STAGE.  
 Descriptrors: TELEVISION CAMERAS; LARGE SCALE INTEGRATION;  
 HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS; IMAGE SENSORS;  
 Identifiers: THIN FILM HYBRID LSI SYSTEM AMPLIFIER;  
 MINIATURIZATION; SOLID STATE IMAGE PICKUP DEVICES; COLOUR TV  
 02  
 Section Class Codes: B3760, B2540, B126G  
 Unified Class Codes: FKKMAK, SMEAAB, AGCHAH

945157 87634362  
 1.7 GHZ IF AMPLIFIERS FOR QUASI-MILLIMETER WAVE RADIO AND  
 GUIDED MILLIMETER WAVE COMMUNICATION SYSTEMS  
 FUJIDA, S.; MATSUURA, T.; SATO, Y.; KITAMURA, M.  
 MIYTON ELECTRIC CO. LTD., TOKYO, JAPAN  
 N.I.C. RES. AND DEV. (JAPAN) NO.40 72-85 JAN, 1976  
 Coden: NEGRAU  
 1.7 GHZ IF AMPLIFIERS ARE USED IN QUASI-MILLIMETER WAVE  
 RADIO SYSTEMS AND GUIDED MILLIMETER WAVE SYSTEMS. A  
 QUASI-MILLIMETER WAVE RADIO SYSTEM REQUIRES A LOW NOISE PRE-IF  
 AMPLIFIER TO BEAR THE RELATIVELY HIGH RECEIVING POWER AND A  
 WIDEBAND IF AMPLIFIER TO PROVIDE A WIDE AUTOMATIC GAIN CONTROL  
 RANGE. A GUIDED MILLIMETER WAVE SYSTEM REQUIRES A LOW NOISE

915453 9763428  
 LINEAR ARRAY OF PHOTORESISTANCES FOR OPTICAL READING  
 CASTAGNOLI, B.; MONNIER, M.; ROSSI, D.  
 IEE, ASSOC. ELETROTECNICA A.D. ELETTRONICA ITALIANA, ET AL.  
 SIM 0 8526149 9  
 151. EUROPEAN SOLID STATE CIRCUITS CONFERENCE-ESSCIRC  
 (EXCEDED AUTOMATICALLY) 109  
 2-5 SEPT. 1975 CANTERBURY, KENT  
 TEE, LONDON, ENGLAND  
 FAST FAXSIMILE TRANSMISSION OF STANDARD A4 DOCUMENTS  
 REQUIRES A SYSTEM IN WHICH THE PAGE IS MOVED IN FRONT OF A  
 LINE OF PHOTODIODES. FOR A RESOLUTION OF 6 POINTS/MM THERE  
 ARE 1200 ELEMENTS IN A LINE. THESE ELEMENTS ARE ELECTRONICALLY  
 SCANNED AT 1 MUS PER POINT WHICH CORRESPONDS TO 2 S FOR THE  
 TRANSMISSION TIME OF A PAGE. THE AUTHORS DESCRIBE A PROTOTYPE  
 READER USING THIN-FILM TECHNOLOGY WHICH CONSISTS IN DEPOSITING  
 1200 PHOTORESISTORS IN A LINE 21 CM LONG. FOR THE  
 PHOTORESISTORS THE AUTHORS USED AN AMORPHOUS SEMICONDUCTOR  
 (AS-416) WHICH IS DEPOSITED AT ROOM TEMPERATURE ON A GLASS  
 SUBSTRATE. NEITHER HEAT NOR CHEMICAL TREATMENTS ARE REQUIRED  
 FOR SENSITIZATION. AS A RESULT, THIS TECHNOLOGY YIELDS A HIGH  
 UNIFORMITY BETTER THAN STANDARD. OVER 20 CM, THIS LINEAR ARRAY  
 IS EIGENTLY ADDRESSED WITH A MATRICAL CROSS-SAR CIRCUIT  
 WHICH IS MADE BY A NEW TECHNOLOGY USING A THIN POLYIMIDE FILM.  
 THE CONNECTION NETWORKS ARE REALIZED ON THE TWO FACES WITH  
 THE INTERCONNECTIONS MADE THROUGH METALLIZED HOLES (80  $\mu$ M IN  
 DIAMETER).  
 Description: FACSIMILE EQUIPMENT: PHOTORESISTORS: THIN FILM  
 CIRCUITS; AMORPHOUS SEMICONDUCTORS  
 Identifiers: OPTICAL READING: AMORPHOUS SEMICONDUCTOR;  
 AS-416: THIN POLYIMIDE FILM: THIN FILM PHOTORESISTORS;  
 FACSIMILE: 21 CM LONG ARRAY: A4 DOCUMENTS: LINEAR ARRAY OF  
 PHOTORESISTORS: 6 POINTS/MM RESOLUTION: 1200 PHOTORESISTORS  
 ARRAYS: SEQUENTIALLY ADDRESSED ARRAY: MATRIX CROSSBAR CIRCUIT  
 D1: Cod.: B3516. B2210. B2254  
 Section Class Codes: FECGAE. SLEAAS. SMCEAH  
 Unified Class Codes: 82540

Section Class Codes: 82540

Unified Class Codes: SLEAAB

944518 87633158  
 HIGH RELIABILITY TA/T AL THIN-FILM HYBRID CIRCUITS  
 DUCWORTH, R.G.  
 CONTROL AND INSTRUMENTATION DIV., ULTRA ELECTRONICS LTD.,  
 ACTION, LONDON, ENGLAND  
 MICROELECTRON. AND RELIAB. (GB) VOL.15, NO.2 141-6  
 1976  
 Codem: MCRLAS  
 OUTLINES A MANUFACTURING SEQUENCE FOR RELIABLE THIN FILM  
 HYBRID CIRCUIT PRODUCTION. FROM BARE SUBSTRATE TO FINAL  
 ENCAPSULATION, THE REASONS WHY PARTICULAR PROCESSES ARE USED  
 ARE GIVEN, AND THE CHOICE OF ALL MATERIALS OF CONSTRUCTION  
 DISCUSSED. CHEMICAL PROCESSING OF THE THIN FILM HAS BEEN  
 ELIMINATED. DURING THE MANUFACTURE OF THE BASIC RESISTOR  
 NETWORKS, TO MINIMISE THE RISK OF CONTAMINATION, WHILST THE  
 FILM IS IN A REACTIVE STATE, THIS HAS BEEN DONE BY EMPLOYING  
 AN EFFICIENT R.F. SPINNER ETCHING PROCESS, TO FORM THE  
 RESISTIVE FILM PATTERN, AND AN 'INCONIAC' MASKING METHOD FOR  
 THE CONTACT FILM DEPOSITION. FOR GOOD LONG TERM PERFORMANCE,  
 THE R.F. SPINNER ETCHING WITH ARGON IONS ALLOWS  
 ACCURATE PATTERNS TO BE EASILY PRODUCED. ON THE RELATIVELY  
 ROUGH CERAMIC SURFACE, FROM FILMS WHICH HAVE BEEN PREVIOUSLY  
 THERMALLY STABILISED IN AIR (400°C).  
 Description: HYBRID INTEGRATED CIRCUITS: THIN FILM CIRCUITS:  
 INTEGRATED CIRCUIT PRODUCTION; LIABILITY  
 Identifiers: MANUFACTURING SLOWDOWN: RESISTIVE FILM PATTERN;  
 CONTACT FILM DEPOSITION: HIGH RELIABILITY; TA/T AL THIN FILM  
 HYBRID CIRCUIT PRODUCTION: RF SPINNER ETCHING PROCESS: ALUMINA  
 CERAMIC SUBSTRATES: INCONIAC MARKING METHOD: AR IONS  
 02  
 Cod.: MCRLB  
 VOL.7. NO.3 53-5 MARCH 1976  
 Cod.: MCRLB  
 Section Class Codes: B2540. B2524  
 Unified Class Codes: SLEAAB, SMCEAH  
 944519 8763159  
 RESISTOR LOOPS IN HYBRID CIRCUITS  
 Smit, P.L.; VAN WIK, J.D.  
 ELEC. ENG. DEPT., RAND AFRIKAANS UNIV., JOHANNESBURG,  
 S.AFRICA  
 MICROELECTRONICS (GB) VOL.7. NO.3 53-5 MARCH 1976  
 Description: RESISTOR CONFIGURATIONS CONTAINING LOOPS OR RINGS ARE  
 ENCOUNTERED FREQUENTLY IN HYBRID THICK OR THIN FILM CIRCUITS.  
 CONFIGURATIONS HAVING SIMPLY INTERCONNECTED LOOPS ARE  
 DISCUSSED. FROM MEASUREMENTS BETWEEN ADJACENT NODES IN THE  
 RESISTOR RING A SET OF EXPERIMENTAL RESISTIVE VALUES MAY BE  
 OBTAINED. IT IS SHOWN HOW THE RING ELEMENTS MAY BE CALCULATED  
 WITH THIS INPUT BY EMPLOYING ITERATIVE TECHNIQUES. TECHNIQUES  
 FOR RAPID CONVERGENCE ARE DISCUSSED. THE TECHNIQUE HAS BEEN  
 APPLIED VIA AN EXISTING MINI-COMPUTER CARACT-INTERFACE DATA

1557

944536 B7633156 ELECTROCHEMICAL TIN-COATING OF TERMINAL TAPE FOR THIN FILM HYBRID INTEGRATED CIRCUITS  
DATEV, K. P.; VACHEV, K. O.; MATEEV, A. HR.  
ELKTR. PROFI-SI, AND PRISOROSTR. (BULGARIA) VOL.11, NO.2  
60-1 FEB. 1976 Coden: EIPBAV  
Examines the process of laying an electrochemical tin coating on a terminal tape used in the manufacture of thin-film and hybrid integrated circuits. A comparison has been made with the electrochemical silver coating, with reference to the advantages offered by the tin coating, with particular case. (5 Refs.)  
Descriptor: ELECTROPLATING; INTEGRATED CIRCUIT PRODUCTION;  
THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS  
Identifiers: TERMINAL TAPE; HYBRID INTEGRATED CIRCUITS;  
ELECTROPLATING SN; THIN FILM ICS  
02  
Section Class Codes: B2540, B5820, B2524  
Unified Class Codes: SMEAB, TMEAQ, SMCEAH  
Language: BULGARIAN

944537 B7633097 BATH BONDED CROSSOVERS FOR THIN FILM CIRCUITS. II.  
GLICK, W. F.; SHOR, H. W.; MYDRA, W. T.; OGIA, R. J.  
DYNATICS INC., WESTBURY, NY, USA.  
WESTERN ELECTRIC ENG. (USA) VOL.20, NO.2 11-15 APRIL  
1976 Coden: WELIAK  
For ref. 1 SEE 1010, P.2-10. FOLLOWING THE DECISION TO USE  
MANUFACTURING EVALUATION OF THE CROSSOVERS ON ESS-TYPE CIRCUIT  
PACBS BEGAN AT THE ALLENTHON WORKS AND THE HAWTHORNE WORKS  
(4 Refs.)  
Descriptor: THIN FILM CIRCUITS; JOINTING PROCESSES  
Identifiers: BATCH BONDED CROSSOVERS; THIN FILM CIRCUITS;  
MANUFACTURING; EVALUATION; CIRCUIT PACBS; CU POLYIMIDE FILM  
02  
Section Class Codes: B2521, B1267  
Unified Class Codes: SMCEAH, AUGKAT

944538 B7633098 BATH BONDED CROSSOVERS FOR THIN FILM CIRCUITS. I.  
BURRS, J. A.; DILEO, D. A.  
WESTERN ELECTRIC ENG. RES. CENTER, PRINCETON, NJ, USA  
1976 Coden: WELIAK  
Instead of using generated by processes performed directly  
upon the easily damaged circuit pattern, an array of a new  
type of crossover is batch bonded to a circuit in a single  
operation that joins, in effect, two pieceparts previously

944539 B7633093 PRODUCTION OF THIN FILM STRUCTURES BY ELECTRON BEAM LITHOGRAPHY  
LEDOVSKOJ, W. P.; MARGOLIN, M. I.; TIEPOK, M. I.; JAKIMOV, T. N.  
FEINGERATE TECH. (GERMANY) VOL.25, NO.5 225-6 MAY  
1976 Coden: FGRTA3  
A THERMAL AND A NONTHERMAL VARIANT ARE DISTINGUISHED. THE  
LATTER IS INVESTIGATED IN MORE DETAIL. THE SEQUENCE OF THE  
PROCESS IS DESCRIBED AND CONCLUSIONS FOR THE TECHNOLOGICAL  
DESCRIPTIONS: THIN FILM CIRCUITS; INTEGRATED CIRCUIT  
Production: ELECTRON BEAM APPLICATIONS  
Identifiers: THIN FILM STRUCTURES; ELECTRON BEAM LITHOGRAPHY  
Process: THERMAL VARIANT; NONTHERMAL VARIANT  
02  
Section Class Codes: B2524, B5820  
Unified Class Codes: SMCEAH, TMEAQ  
Language: GERMAN

944493 8763309<sup>2</sup> THIN-FILM HYBRID INTEGRATED CIRCUITS WITH HIGHER ACCURACY OF THE RATIO OF INTEGRATED RESISTORS

ELFINTRO, PROM-ST. AND PRIBORDOSTR. (BULGARIA) VOL. 11, NO. 3 10-1 MARCH 1976 Coden: EPBAY INTEGRATED CIRCUIT TECHNOLOGY IS DESCRIBED ESPECIALLY RESULTING IN HIGH ACCURACY RESISTOR FORMING ESPECIALLY INTEGRATED CIRCUITS. HIGH ACCURACY IS DUE TO PHOTOLITHOGRAPHIC TECHNIQUES, PRODUCING REPETITIVE ALMOST IDENTICAL FILM OUTLINES. EXPERIMENTAL DIVIDER CIRCUITS: THIN FILM RESISTORS: EXPERIMENTAL RESULTS 02

Div.-editors: THIN FILM RESISTORS: PHOTOLITHOGRAPHY: HYBRID INTEGRATED CIRCUITS

Identifiers: HYBRID INTEGRATED CIRCUITS; HIGH ACCURACY RESISTOR FORMING; PHOTOLITHOGRAPHIC TECHNIQUES; 0.0PERCENT RATIO ACCURACY; THIN FILM CIRCUITS: EXPERIMENTAL DIVIDER CIRCUITS: THIN FILM RESISTORS: EXPERIMENTAL RESULTS

02

Section Class Codes: B2524, B2540

Unified Class Codes: SMEAB

Language: BULGARIAN

944494 87633076 DO YOU DESIGN YOUR FILM CIRCUIT FOR FABRICATION?

AERFAIRN, W.-I. RINI, H.

SILTECH AG, MUNICH, H.

COMPONENTS REP. (GERMANY)

CLOUD, CAREC3 VOL. 10, NO. 5 134-8 DEC. 1975

WITH FILM CIRCUITS, A PROFOUND KNOWLEDGE OF THE FABRICATION TECHNOLOGY AND THE MANUFACTURING PROCESSES IS INDISPENSABLE FOR THE EQUIPMENT AND CIRCUIT DESIGNERS IN VIEW OF AN OPTIMAL DEVELOPMENT AND AN ECONOMIC FABRICATION. THE ARTICLE FURTHER GIVES THE CIRCUIT DESIGNER IDEAS FOR TECHNICALLY SIMPLE AND THUS ECONOMICALLY EFFECTIVE CIRCUIT CONCEPTS. THE MOST IMPORTANT DESIGN PRINCIPLES FOR FILM CIRCUITS ARE LISTED IN A GUIDE LINE

12 (b, f)

Div.-editors: THIN FILM CIRCUITS: THICK FILM CIRCUITS:

Identifiers: FABRICATION TECHNOLOGY; MANUFACTURING PROCESSES 1. COST-EFFECTIVE CIRCUIT CONCEPTS; DESIGN PRINCIPLES: THICK FILM CIRCUITS: THIN FILM CIRCUITS: CIRCUIT DESIGN

02

Section Class Codes: B2520

Unified Class Codes: SMEAB

QUEENSLAND, TOWNSVILLE, NORTH QUEENSLAND, AUSTRALIA

TELE TRANS. CIRCUITS AND SYST. (USA) VOL.CAS-23, NO.7

443-6 JULY 1976 Coden: IYC8Y1 MEANS OF COMPENSATING FOR THE FINITE GAIN BANDWIDTH OF OPERATIONAL AMPLIFIER, WHEN USED IN VOLTAGE CONTROLLED VOLTAGE SOURCE AND INVERTING INTEGRATOR BLOCKS, ARE DESCRIBED AND ARE SHOWN TO VIRTUALLY ELIMINATE EXCESS PHASE SHIFTS OVER A PRESCRIBED FREQUENCY RANGE. AS APPLIED TO INTEGRATOR, THE COMPENSATING TECHNIQUE SIMULTANEOUSLY REDUCES GAIN (PERIOD) AND PHASE ERRORS. THE METHODS SHOULD PROVE OF MAXIMUM ADVANTAGE WHERE TRIMMING OF THE RC ELEMENTS IS DIFFICULT OR EXPENSIVE AS IN THIN-FILM REALISATION. IT IS SHOWN THAT THE OVERALL TEMPERATURE STABILITY OF THE COMPENSATED NETWORK CAN BE SIGNIFICANTLY IMPROVED. (11 refs)

Div.-editors: OPERATIONAL AMPLIFIERS; ACTIVE NETWORKS; INTEGRATING CIRCUITS; THIN FILM CIRCUITS

Identifiers: FINITE GAIN BANDWIDTH; OPERATIONAL AMPLIFIER; VOLTAGE CONTROLLED VOLTAGE SOURCE; INVERTING INTEGRATOR BLOCKS; ELIMINATE EXCESS PHASE SHIFTS; PRESCRIBED FREQUENCY RANGE; INTEGRATOR; COMPENSATING TECHNIQUE; GAIN; PHASE ERRORS; TRIMMING; RC ELEMENTS; THIN-FILM REALISATION; TEMPERATURE STABILITY; RC ACTIVE NETWORKS

02

Section Class Codes: B1840, B1880, B1890, B2524

Unified Class Codes: SMEAB, ETAAAM, ETAAAC, SMEAH

937316 87628650, C7619783 SUBHANSECOND BASE-COUPLED LOGIC CIRCUITS

MEYER, F.

SIEMENS AG, MUNICH, GERMANY

TEE, ASSOC. ELETROTECNICA AND ELETTRONICA ITALIANA, ET AL. WITH FILM CIRCUITS, A PROFOUND KNOWLEDGE OF THE FABRICATION TECHNOLOGY AND THE MANUFACTURING PROCESSES IS INDISPENSABLE FOR THE EQUIPMENT AND CIRCUIT DESIGNERS IN VIEW OF AN OPTIMAL DEVELOPMENT AND AN ECONOMIC FABRICATION. THE ARTICLE FURTHER GIVES THE CIRCUIT DESIGNER IDEAS FOR TECHNICALLY SIMPLE AND THUS ECONOMICALLY EFFECTIVE CIRCUIT CONCEPTS. THE MOST IMPORTANT DESIGN PRINCIPLES FOR FILM CIRCUITS ARE LISTED IN A GUIDE LINE

12 (b, f)

Div.-editors: THIN FILM CIRCUITS: THICK FILM CIRCUITS:

Identifiers: FABRICATION TECHNOLOGY; MANUFACTURING PROCESSES 1. COST-EFFECTIVE CIRCUIT CONCEPTS; DESIGN PRINCIPLES: THICK FILM CIRCUITS: THIN FILM CIRCUITS: CIRCUIT DESIGN

02

Section Class Codes: C9260, C9220, B2524

Unified Class Codes: XEGAAJ, XECAAJ, SMEAH

943199 87632417 COMPENSATION OF SOME OPERATIONAL-AMPLIFIER BASED RC-ACTIVE NETWORKS

WILSON, G.

Div. ELECTRICAL

ENGG.,

JAMES COOK UNIV. OF NORTH

93345B B7629574  
THIN FILM CIRCUITS IN TRANSMISSION EQUIPMENT  
SCHIPPER, C. A.  
PHILLIPS TELECOMMUN. REV. (NETHERLANDS) VOL.34, NO.1  
38-41 APRIL 1976 Coden: PLRWM  
REVIEWS THE SIGNIFICANCE OF HYBRID THIN FILM CIRCUITS FOR TRANSMISSION EQUIPMENT AND IT PROVIDES THE SALIENT POINTS OF THE SPECIFICATIONS AND TECHNOLOGY NEEDED. FURTHERMORE, AN ELABORATION IS GIVEN OF HOW A MODEL SHOP FOR HYBRID CIRCUITS, USED AS AN IN-HOUSE FACILITY, MAY SUPPORT THE ELECTRICAL DEVELOPMENT. ESPECIALLY DIRECT CONTACTS BETWEEN ELECTRONIC ENGINEERS AND TECHNOLOGISTS COULD LEAD TO OPTIMAL DESIGNS AND RELATIVELY SHORT LEAD TIMES.  
DISCLOSURES: DIGITAL COMMUNICATION SYSTEMS; HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS  
Identifiers: HYBRID THIN FILM CIRCUITS; TRANSMISSION EQUIPMENT; SPECIFICATIONS; TECHNOLOGY; MODEL SHOP; DIGITAL TRANSMISSION EQUIPMENT  
02 Section Class Codes: B3510, B2540, B2524  
Unified Class Codes: FECAX, SMEAB, SMCEAH

932662 B7626710  
ENGINEERING OF MICROELECTRONIC THIN AND THICK FILMS  
JOFETI, C.E.  
MACMILLAN LONDON, ENGLAND  
1976  
TO ENABLE DESIGNERS, PRODUCTION AND PROJECT ENGINEERS TO USE THICK AND THIN FILMS TO THE BEST ADVANTAGE, THIS BOOK EXAMINES THE GENERAL ENGINEERING ASPECT PARTICULARLY WHERE IT WILL LEAD TO CIRCUIT DESIGN AND PRODUCTION RULES DIFFERENT FROM THOSE THAT HAVE BECOME COMMON PRACTICE WITH DISCRETE COMPONENT ASSEMBLIES  
Identifiers: THIN FILM CIRCUITS; THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS  
Identifiers: GENERAL ENGINEERING ASPECT; THIN FILMS; THICK FILMS; MICROELECTRONICS  
03 Section Class Codes: B2540, B2524, B2522  
Unified Class Codes: SMEAB, SMCEAH, SMCCAX

932661 B762B709  
AN EVALUATION OF TECHNIQUES FOR BONDING BEAM-LEAD DEVICES TO GOLD THICK FILMS  
DAWES, C.J.  
WELDING INST., MICRO WELDING SECTION, CAMBRIDGE, ENGLAND  
SOLID STATE TECHNOL. (USA) VOL. 19, NO.3 23-8 MARCH 1976 COUNC: SSI/SEAP  
DISCUSSES THREE TECHNIQUES FOR BONDING BEAM-LEAD DEVICES TO FITTED AU SCREEN PRINTED THICK FILMS ON CERAMIC SUBSTRATES. THE AUTHOR DISCUSSES RESULTS OF EVALUATION TESTS ON THERMOCOMPRESS (TC), WOBBLE BONDING, TC COMPLIANT BONDING, AND ULTRASONIC IC WOBBLE BONDING. THE IMPORTANT PARAMETERS AND THE IR EFFECTS ON RELIABILITY AND BOND STRENGTH ARE DESCRIBED (10 Refs)  
Identifiers: HYBRID INTEGRATED CIRCUITS; BEAM-LEAD DEVICES; THICK FILM CIRCUITS; JOINING PROCESSES; INTEGRATED CIRCUIT PRODUCTION  
Identifiers: EVALUATION OF TECHNIQUE; AU THICK FILMS; BEAM LEAD DEVICE BONDING; BONDING TO AU THICK FILMS; BOND EVALUATION; EXPERIMENTAL RESULTS; HYBRID ICs  
02 Section Class Codes: B2540, B2564, B1267  
Unified Class Codes: SMEAB, SMCEAN, ADGMAT

932663 B762B711  
SCREEN-PRINTED COPPER CONDUCTORS FOR HYBRID CIRCUITRY  
BAUDRY, H.; ANDREAE, M.  
LAB. D' ELECTRONIQUE ET DE PHYS. APPLIQUEE, LIMET-BREVANNES, FRANCE  
IEE, ASSOC. ELETROTECNICA AND ELETTRONICA ITALIANA, ET AL.  
SUN 0 B5296 149 9  
1ST EUROPEAN SOLID STATE CIRCUITS CONFERENCE-ESSCIRC  
(EXTENDED ABSTRACTS ONLY) B4 1975  
2-5 SEPI. 1975 CANTERBURY, KENT  
IEE LONDON, ENGLAND  
DESCRIBES A COPPER PASTE WITH A NON-TRADITIONAL VITREOUS BINDER (A SEALING MATERIAL FOR DIRECT CERAMIC-TO-METAL SEALS), AN IMPROVED ORGANIC TEMPORARY BINDER ('VEHICLE'), AND A SELLECTED COPPER POWDER. FIRING SUCH A MATERIAL IS POSSIBLE EITHER IN NEUTRAL ATMOSPHERE OR IN A REDUCING GAS. ADHESION TO CERAMIC SUBSTRATES IS REINFORCED AND RELATED TO FIRING CONDITIONS. ELECTRICAL CONDUCTIVITY IS BETTER THAN CONDUCTIVITY OF GOLD AND HIGH FREQUENCY DATA ARE GIVEN. IN SPITE OF THE INCREASED COST OF THE ORGANIC VEHICLE, AND OF THE DEVELOPMENT OF A SPECIAL GLASS BINDER, AND FINAL COST PRICE OF THE PASTE REMAINS APPROXIMATELY A TENTH OF THAT OF GOLD PASTES  
Identifiers: HYBRID CIRCUITS; HYBRID INTEGRATED CIRCUITS  
TEMPORARY BINDER; FIRING CONDITIONS; SCREEN PRINTING CU PASTES  
06 Section Class Codes: B2540, B2522  
Unified Class Codes: SMEAB, SMCCAX

932659 B7628707  
APPLICATIONS OF THICK FILM HYBRIDS  
WHITELEY, D.  
BELGIAN INSTRUMENTS LTD., GLENROTHES, SCOTLAND  
NEW ELECTRON. (GB) VOL.9, NO.6 65, 69, 71 23 MARCH  
Coden: NWELAC

THE MILITARY DEFENCE AEROSPACE MARKET HAS BEEN THE PRIME AREA FOR HYBRIDS FOR MANY YEARS. THE CONSUMER MARKET HAS PROVIDED TO BE EXTREMELY GOOD FOR RESISTOR NETWORKS, BUT DUE TO THE HIGH VOLUME REQUIREMENTS, MONOLITHIC INTEGRATED CIRCUITS HAVE BEEN FAR MORE COST EFFECTIVE THAN HYBRIDS IN THE MAJORITY OF CASES. IN THE GENERAL INDUSTRIAL MARKET, HYBRIDS HAVE BEEN ACTIVE IN SOME SPECIFIC AREAS, NAMELY DATA PROCESSING, COMMUNICATIONS, AND NAVIGATION.

Descriptors: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; IDENTIFIERS: RESISTOR NETWORKS; PRIME AREA: HYBRIDS; CONSUMER COMMUNICATIONS; NAVIGATION; PACKAGING; ECONOMICS; PRICING; PRINTED CIRCUITS

02  
Section Class Codes: B2524, B2522  
Unified Class Codes: SMEAAB, SMCCAX  
Language: FRENCH

932657 B7628705  
HOW TO RESOLVE THERMAL PROBLEMS IN HYBRID MICROELECTRONICS  
KERSZMAN, G.  
ELECTRON. AND MICROELECTRON. IND. (FRANCE) NO.218, 24-9  
1 APRIL 1976 Coden: ENIAS

A THEORETICAL INTRODUCTION TO HEAT TRANSFER PROBLEMS IN THICK-FILM CIRCUITS ALSO CONTAINS SOME EMPIRICAL COEFFICIENTS AND A TABLE OF THERMAL CONDUCTIVITIES OF VARIOUS RELEVANT SUBSTANCES. CONSIDERATION IS GIVEN TO HORIZONTAL AND VERTICAL MOUNTING ON TO A PRINTED CIRCUIT AND TO MOUNTING ON A HEAT SINK. (7 Refs)

Descriptors: HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS; IDENTIFIERS: HYBRID MICROELECTRONICS; HEAT TRANSFER; THERMAL CONDUCTIVITIES; MOUNTING; PRINTED CIRCUIT; HEAT SINK; THIN FILM CIRCUITS

02  
Section Class Codes: B2540, B2524  
Unified Class Codes: SMEAAB, SMCEAH  
Language: FRENCH

932659 B7628647  
REALIZATION OF A THREE LAYER THIN FILM RC NETWORK  
LOJACONO, R.; SALVENDO, M.  
ISTITUTO DI COMUNICAZIONI, ELETTRICHE, UNIV. DI ROMA, ROMA, ITALY  
ALIA FREQ. (ITALY) VOL.45, NO.3 213-17 MARCH 1976  
Coden: ALRAJ

ANALYSIS OF THREE LAYER THIN FILM DISTRIBUTED RC NETWORK TECHNOLOGY IS PRESENTED. FORMULAS AND GRAPHS ARE QUOTED FOR COMPONENT VALUES WITH EXPERIMENTAL RESULTS. THE PROTOTYPE CONFIRMED THAT IT IS POSSIBLE TO OBTAIN HIGH ACCURACIES IN RESPECT OF TIME CONSTANTS AND FREQUENCY (7 Refs)

Descriptors: DISTRIBUTED PARAMETER NETWORKS; THIN FILM CIRCUITS; IDENTIFIERS: THREE LAYER THIN FILM; DISTRIBUTED RC NETWORK ANALYSIS

02  
Section Class Codes: B2524  
Unified Class Codes: SMEAAB  
Language: ITALIAN

932619 B7628649  
THIN-FILM TECHNOLOGY  
CILHEITI, M.; ROGIA, D.  
TELETRA (ITALY) NO.27 45-50 NOV. 1975 Coden: TELTBC  
A GENERAL DESCRIPTION OF THE TECHNOLOGY IS GIVEN AND A COMPARISON WITH THICK-FILM TECHNOLOGY IS MADE  
Descriptors: THIN FILM CIRCUITS  
Identifiers: GENERAL DESCRIPTION: COMPARISON: THIN FILM TECHNOLOGY

932616 B7628646 SOPHISTICATED TECHNIQUES SOLVE INK MANUFACTURING PROBLEMS

VITROL, W.A.; HODGE, P.M.  
BECKMAN INSTRUMENTS INC., HELIOPOT DIV., FULLERTON, CA, USA  
SOLID STATE TECHNOL. (USA)  
1976 Coden: SSTEAP  
AS THE COMPLEXITY OF HYDRO THICK-FILM INTEGRATED CIRCUITS  
AND NUMBER OF MATERIALS INCREASE, A MORE COMPLETE  
CHARACTERIZATION IS DEMANDED. THE AUTHOR DESCRIBES EQUIPMENT  
USED TO GIVE A TOTAL PICTURE OF THE CHEMICAL AND PHYSICAL  
PROPERTIES AT HAND. THE SAME EQUIPMENT THAT IS USED FOR GIVING  
A COMPLETE CHARACTERIZATION OF MATERIALS IS ALSO USED FOR GIVING  
PROBLEM SOLVING. THIS PAPER SHOWS, USING SEVERAL EXAMPLES, HOW  
HAVING TOTAL CONTROL OVER THICK FILM MATERIAL PROPERTIES CAN  
GIVE A DISTINCT ADVANTAGE IN SOLVING PROCESS AND MATERIAL  
PROBLEMS THROUGH THE USE OF DEVELOPMENTAL TOOLS  
Identifiers: INK MANUFACTURING PROBLEMS: TOTAL CONTROL;  
THICK FILM MATERIAL PROPERTIES: THICK FILM INKS; HYBRID  
INTEGRATED CIRCUITS: INK CHARACTERISATION: CHARACTERISATION  
02

Section Class Codes: B1860, B3740, B2524  
Unified Class Codes: SMCAK, SMCEAH

HIGH LEVEL MIXERS GO THIN FILM WITH COMPLEMENTARY LD DRIVE  
AMPLIFIERS  
CHEADE, D.L.  
WATKINS-JOHNSON CO., PALO ALTO, CA, USA  
MICRODAVE SIST. NEWS (USA) VOL.6, NO.1 72-7 FEB.-MARCH  
1976 Coden: MWNA9  
SMALL SIZE, IMPROVED HIGH FREQUENCY 3RD ORDER SUPPRESSION  
AND HIGHER RF INPUT POWER HANDLING CAPACITY ARE CHIEF FEATURES  
IN NEW FAMILY OF MIXERS. CASCADABLE AMPLIFIERS PROVIDE +20 DBA  
LD DRIVE IN 10-B PACKAGE (2 refs)  
Descriptors: MIXERS (CIRCUITS); RADIOFREQUENCY AMPLIFIERS;  
THIN FILM CIRCUITS  
Identifiers: IMPROVED HIGH FREQUENCY; 3RD ORDER SUPPRESSION;  
RF INPUT POWER HANDLING; TO-B PACKAGE; HIGH LEVEL MIXERS; THIN  
FILM CIRCUITS; CASCADABLE AMPLIFIERS; LOCAL OSCILLATOR DRIVE  
02

Section Class Codes: B1860, B3740, B2524  
Unified Class Codes: SMCAK, SMCEAH

921946 B7625681

CONSIDERATIONS ON THE DESIGN OF A NEW PCM MULTIPLEX TERMINAL  
LUCCHETTI, M.; VAGLIANI, F.C.  
TELETRON, DIGITAL TRANSMISSION AND WIRE COMMUNICATION DIV.,  
VIMERCATE, ITALY

1976 ET AL.  
1976 INTERNATIONAL CONFERENCE ON DIGITAL COMMUNICATIONS  
9-11 MARCH 1976 ZURICH, SWITZERLAND  
TELE NEW YORK, USA  
DESCRIBES THE PROJECT CHOICES AND SOME TECHNICAL AND  
FUNCTIONAL FEATURES OF A NEW PCM MULTIPLEX TERMINAL FOR 30  
SPEECH CHANNELS. THE USE OF NEW COMPONENTS AND TECHNOLOGIES  
HAS GREATLY INFLUENCED DESIGN AND STRUCTURE, PERMITTING A  
GREATER RELIABILITY AND COMPACTNESS. LS1, CNOS, TTLs, THIN  
THICK FILM CIRCUITS AND BEAM LEAD DEVICES HAVE BEEN USED  
WHICH MAKE CUSTOM INTEGRATED CIRCUITS UNNECESSARY (B refs)  
Identifiers: MULTIPLEXING EQUIPMENT; PULSE-CODE MODULATION  
LINKS; DIGITAL INTEGRATED CIRCUITS; LARGE SCALE INTEGRATION;  
TIME DIVISION MULTIPLEXING  
Design: STRUCTURE; PCM MULTIPLEX TERMINAL; 30 SPEECH CHANNELS;  
THICK FILM CIRCUITS; BEAM LEAD DEVICES; THIN FILM CIRCUITS  
06

Section Class Codes: B3420, B1870, B2528  
Unified Class Codes: FEGAC, FCEAN, ETNAAP, SMCAK

932115 B7628645 FILM CIRCUIT ACTIVITY IN THE UK

BISWELL, D.  
FILM CIRCUIT DIV., ITT COMPONENTS GROUP, HARLOW, ENGLAND  
NEW ELECTRON. (GB) VOL.9, NO.6 62, 64-5 23 MARCH 1976  
Coden: NEELAC

MEASURED IN FINANCIAL TERMS THE UK HAS THE LARGEST ACTIVITY  
LEVEL IN FILM CIRCUITS OF ALL EUROPEAN COUNTRIES. IT CAN ALSO  
BOAST A VERY WIDE APPLICATION RANGE COVERING THE ENTIRE  
ELECTRONICS. THE PURPOSE OF THIS ARTICLE IS TO REVIEW  
OUR POSITION IN EACH FIELD AND COMPARE ITS STATUS WITH THAT OF  
THE REST OF THE WORLD. Necessarily, MENTIONED MANUFACTURING  
METHODS AND EXPERIENCE IN KNOWING WHERE TO PLACE FILM CIRCUITS  
OF VARIOUS TYPES TO ADVANTAGE, HAS UNLOCKED LARGE EXPLOITABLE  
MARKET AREAS  
Identifiers: THICK FILM CIRCUITS; THIN FILM CIRCUITS  
Character: FINANCIAL TERMS; THIN FILM CIRCUITS  
Manufacturing: SPACE ELECTRONICS; MECHANISED  
ACTIVITY; THICK FILM CIRCUITS; AVIONICS; THIN FILM CIRCUITS  
02

Section Class Codes: B2522, B2524  
Unified Class Codes: SMCAK, SMCEAH

921250 B7624925. A BETTER SUBSTRATE FOR (MICROWAVE) MIXERS?  
FUSED SILICA. (A. KENNEDY, W. CRESCENI, E.J., JR.; MARKI, F.A.; KENNEDY, W. SOLID STATE WATKINS-JOHNSON CO., PALO ALTO, CA, USA. NO. 1 34-5. 39-40. 43 JAN. 1976. Coden: MCWPAR. Describers: THE ADVANTAGES OF FUSED SILICA, A MATERIAL COMMONLY USED IN OPTICS, FOR J-BAND MIXER APPLICATIONS. IT ALLOWS THIN-FILM CIRCUITS TO BE BUILT ON RELATIVELY LOW DIELECTRIC CONSTANT SUBSTRATES. (7 REFS.) Description: MICROWAVE INTEGRATED CIRCUITS: THIN FILM CIRCUITS: MIXERS: (CIRCUITS): SOLID-STATE MICROWAVE CIRCUITS. Identifiers: FUSED SILICA: SUBSTRATES: MICROWAVE MIXERS: J-BAND: LOW DIELECTRIC CONSTANT: THIN FILM CIRCUITS: MICROWAVE INTEGRATED CIRCUITS 02. Section Class Codes: B2540, B1860, B1820, B2524 Unified Class Codes: SMEAB, ETMAAG, ETEAD, SMEAB

Section Class Codes: B2540, B1860, B1820, B2524  
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921250 B7624925. A BETTER SUBSTRATE FOR (MICROWAVE) MIXERS?  
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920860 B7624513 DESIGNING AND REALISING ACTIVE THICK-FILM RC FILTERS  
RUPP, W. INST. FÜR NETZWERKTHEorie AND SCHALTUNGSTECH., TECH. UNIV., MÜNCHEN, GERMANY

921250 B7624925. A BETTER SUBSTRATE FOR (MICROWAVE) MIXERS?  
FUSED SILICA. (A. KENNEDY, W. CRESCENI, E.J., JR.; MARKI, F.A.; KENNEDY, W. SOLID STATE WATKINS-JOHNSON CO., PALO ALTO, CA, USA. NO. 1 34-5. 39-40. 43 JAN. 1976. Coden: MCWPAR. Describers: THE ADVANTAGES OF FUSED SILICA, A MATERIAL COMMONLY USED IN OPTICS, FOR J-BAND MIXER APPLICATIONS. IT ALLOWS THIN-FILM CIRCUITS TO BE BUILT ON RELATIVELY LOW DIELECTRIC CONSTANT SUBSTRATES. (7 REFS.) Description: MICROWAVE INTEGRATED CIRCUITS: THIN FILM CIRCUITS: MIXERS: (CIRCUITS): SOLID-STATE MICROWAVE CIRCUITS. Identifiers: FUSED SILICA: SUBSTRATES: MICROWAVE MIXERS: J-BAND: LOW DIELECTRIC CONSTANT: THIN FILM CIRCUITS: MICROWAVE INTEGRATED CIRCUITS 02. Section Class Codes: B2540, B1860, B1820, B2524 Unified Class Codes: SMEAB, ETMAAG, ETEAD, SMEAB

921250 B7624895 THE SQUEEGEE IN PRINTING OF ELECTRONIC CIRCUITS  
DUNLEY, G. C. SOLID STATE PHYS. LAB., DELHI, INDIA. VOL. 14, NO. 5-6. 427-9 1975. Coden: MCCLAS. Describers: MCCLAS IS AN IMPORTANT TOOL IN SCREEN PRINTING OF THICK FILM CIRCUITS TO CONTROL THE UNIFORMITY IN PAINT THICKNESS. (WHICH SUBSEQUENTLY CONTROLS THE COMPONENT VALUES). THE PIGMENTED PAPER CUSHIONES THE VARIOUS MATERIALS AND SHAPES OF THE SQUEEGEE. IT HAS BEEN SHOWN THAT POLYURETHANE IS THE BEST MATERIAL FOR USE AS A SQUEEGEE IN OFF CONTACT PRINTING (9 REFS.) Description: THICK FILM CIRCUITS: INTEGRATED CIRCUIT PRODUCTION Identifiers: SQUEEGEE; SCREEN PRINTING; THICK FILM CIRCUITS: POLYURETHANE: OFF CONTACT PRINTING 02. Section Class Codes: U3522 Unified Class Codes: SMECAK

921218 A7650818, B7624888 INFRARED SCANNING MICROSCOPE (FOR MICROELEMENT INSPECTION)  
OVCHARENKO, G. M.; SOBOLEV, N. F.; SHABASHEV, O. K. Opt.-TEKH. PROM.-ST. (USSR) VOL.42 NO.10 31-3 OCT. 1975 Coden: OPTPAQ Trans. of: Sov. J. OPT. TECHNOL. (USA) VOL.42 NO.10 588-10 OCT. 1975 Coden: SJOTB A PHOTOGRAPH AND A SCHEMATIC OF THE OPTICAL HEAD OF THE MICROSCOPE, DEVELOPED FOR THE TESTING OF HYBRID AND INTEGRATED MICROCIRCUITS, AND MULTILAYER PRINTED CIRCUIT BOARDS ETC., ARE

920726 87624351  
A FEEDFORWARD S-BAND MIC AMPLIFIER SYSTEM  
HSTH, C.-C.  
DEP. OF ELECTRICAL ENGG. AND COMPUTER SCI., UNIV. OF SANTA  
CLARA, SANTA CLARA, CALIF. 95051, USA  
Section Class Codes: B1650, B2524, B1840, B1850  
Unified Class Codes: EMAH, SMEAH, ETMAH, ETKAAR  
Availability: UNIV. MICROFILMS, ANN ARBOR, MICH., USA. ORDER  
NO. 75-22222

IEEE J. SOLID-STATE CIRCUITS (USA) VOL. SG11, NO. 2 APRIL 1976 Cordon: IUSC/C IEEE J. SOLID-STATE CIRCUITS (USA) VOL. SG11, NO. 2 271-8  
**A 2.2 GHz HIGH-POWER FEEDFORWARD AMPLIFIER SYSTEM HAS BEEN DESIGNED AND FABRICATED, WHICH HAS AN RF GAIN OF 30 dB AND AN OUTPUT POWER OF 1.25 W WITH ALL IMD DISTORTION PRODUCTS AT LEAST DOWN 50 dB FROM THE CARRIER LEVEL. THE POWER AMPLIFIERS ARE ALL REALISED IN THIN-FILM HYBRID FORM, THE THEORETICAL DEVELOPMENT OF THE SYSTEM IS DESCRIBED. THE RESULT OF THE TEMPERATURE STABILITY TESTS IS GIVEN. THE COMPUTER OPTIMISATION TECHNIQUE WITH MULTIBIWEIGHTING FUNCTIONS USED THROUGHOUT THE AMPLIFIER DESIGN PROCESS IS PRESENTED. FINALLY, PRACTICAL APPLICATIONS AND A COMPARISON OF THE ADVANTAGES AND DISADVANTAGES OF THIS (FEEDFORWARD) AMPLIFIER SYSTEM WITH THOSE PROVIDED BY USING THE CONVENTIONAL (BACK-OFF) APPROACH ARE DISCUSSED. (14 Refs.)**  
**Descriptors:** MICROWAVE CIRCUITS; HYBRID INTEGRATED CIRCUITS; MICROWAVE AMPLIFIERS; LINEAR AMPLIFIERS; FEEDFORWARD MIC AMPLIFIER SYSTEM; RF AMPLIFIERS; OUTPUT POWER; IM DISTORTION PRODUCTS; POWER AMPLIFIERS; TEMPERATURE STABILITY; TESTS; COMPUTER OPTIMISATION TECHNIQUE; MULTIBIWEIGHTING FUNCTIONS; THIN FILM HYBRID FORM; 2.2 GHZ HIGH POWER AMPLIFIER SYSTEM.

10 Section Class Codes: B1650, B2524, B1840, B1850  
Unified Class Codes: EMAH, SMEAH, ETMAAR  
Academic Ability: UNIV, MICROFLMS, ANN ARBOR, MICH., USA. ORDER  
NO. 75-22222

909279 87622041 ACTIVE TONE CONTROL DEVICE IN TANTALUM THINFILM TECHNOLOGY  
 BOSELMANN, W.  
 SISTEMES AG., MUNCHEN, GERMANY  
 COMPONENTS REP. (GERMANY) VOL. 10, NO. 4 104-7 OCT. 1975  
 Coden: CHAEC3

DISCUSSIONS TONE CONTROL NETWORKS USED IN HI FI CLASSIFIED AS AMPLIFIERS. ACTIVE RC FILTERS OF TA-THIN FILM TECHNOLOGY OFFER THE MOST ADAPTABILITY BECAUSE OF THE CENTRE FREQUENCY IS CONTINUOUSLY VARIABLE. THE ARTICLE EXPLAINS THE FUNCTION AND DESIGN OF SUCH ACTIVE FILTER NOT WITHOUT CONSIDERING PASSIVE RC- AND LCR CIRCUITS. THE THINFILM CIRCUIT LAYOUT AND REGULATING POSSIBILITIES OF THIS MODERN TONE CONTROL MEET HIGH REQUIREMENTS. (1 ref.)

Descriptor: AUDIO-FREQUENCY AMPLIFIERS: ACTIVE FILTERS; THIN FILM CIRCUITS; TANTALUM IDENTIFIERS: ACTIVE FILTER; CIRCUIT LAYOUT; HI FI; ADJUSTABLE AMPLIFIERS; ACTIVE TONE CONTROL NETWORKS; TA THIN FILM IC; ADJUSTABLE CENTRE FREQUENCY; ACTIVE RC FILTERS; CIRCUIT

Section Class Codes: B3780, B1840, B1880, B2524  
Unified Class Codes: FKRAAF, ETHAAB, ETRAAM, SMCEAH

07/14 87G2438 DESIGN, FABRICATION, AND APPLICATION OF UNIFORMLY SUBSTITUTED RC NETWORKS FOR USE IN ELECTRONIC CIRCUITS  
KANANIANA

MISSOURI, ROLLA, USA  
THE INDEFINITE ADMITTANCE MATRIX FOR THE DOUBLE-RESISTIVE  
OR THE SINGLE-RESISTIVE UNIFORMLY DISTRIBUTED RC NETWORKS IS USED  
AT THE STARTING POINT. THE RESULTS ARE APPLIED TO REDUCTION IN  
THE NUMBERS OF ELEMENTS NEEDED FOR RC-COUPLED AMPLIFIERS,  
MULTIVIBRATOR CIRCUITS, HIGH-Q (10 TO 150) BAND-PASS  
OSCILLATORS, AND PHASE-SHIFT OSCILLATORS. THE PROCEDURES FOR  
SIGHTING AND FABRICATING UNIFORMLY DISTRIBUTED RC NETWORKS  
ARE REVIVED IN DETAIL. A REVIEW OF BOTH THIN-FILM FABRICATION  
IN VACUUM DEPOSITION AND SEMICONDUCTOR FABRICATION BY  
DISCUSSEES IS INCLUDED.

908004 B7620574 ALUMINA CERAMICS FOR ELECTRONIC AND ELECTRICAL PURPOSES  
PODORANYI, I.; SZTANKOVICS, L.  
HIRADSTECH, IPIRE KUT, INTEZ, KOZL. (HUNGARY) VOL.15, NO.3  
31-45 1975 Coden: HIRWAB  
HIGH PURITY MATERIALS WITH 99.8 PER CENT AL<sub>2</sub>0<sub>3</sub> AND 3/015B 3/  
MICROHOLE AND VACUUM-TECHNOLOGICAL APPLICATIONS. FROM CERAMICS  
WITH HIGH, 97-98 PER CENT, ALUMINA CONTENTS, THE PACKAGING OF  
THICK FILM AND SEMICONDUCTOR INTEGRATED CIRCUITS, TUNABLE VHF  
COUPLING AND RESISTOR UNDIES ARE FABRICATED. FINALLY  
CERAMICS WITH 95 PER CENT ALUMINA CONTENTS ARE USED FOR  
INSULATING PURPOSES AS ANTENNA INSULATORS AND OTHER ELECTRICAL  
INSULATIONS. THE CHARACTERISTICS OF THE THREE CERAMIC TYPES ARE  
TABULATED. SOME OF THE MORE IMPORTANT REQUIREMENTS CONCERNING  
THE RAW MATERIAL AND THE PROCESSING OF CERAMICS AN THE USE OF  
FINISHED CERAMICS ARE GIVEN  
Descriptors: CERAMICS; CERAMICS; INSULATING MATERIALS; INTEGRATED  
CIRCUITS; MICROWAVE TUBES  
Identifiers: TRANSMITTING TUBES; PACKAGING; SEMICONDUCTOR  
INTEGRATED CIRCUITS; RESISTOR BODIES; ANTENNA INSULATORS;  
ELECTRICAL INSULATOR; ALUMINA CERAMICS; ELECTRONIC  
APPLICATIONS; ELECTRICAL APPLICATIONS; MICROWAVE APPLICATIONS;  
VACUUM APPLICATIONS; THICK FILM CIRCUITS; TUNABLE VHF COIL  
02

Section Class Codes: B2610, B2222, B2228, B2B50  
Unified Class Codes: SNCAY, SMCCAK, SMKAK, SCAAN  
Language: HUNGARIAN

907992 B7620562 SOLDERLESS THICK FILM HYBRIDS  
HEATHRINGTON, D.  
NICHARDEN TRANSISTORS LTD., NEARKET, ENGLAND  
ELCTRON (GB) NO.91 29, 31 11 MARCH 1976 Coden:  
ELTHL  
PROJECTION RESISTANCE WELDING HAS BEEN USED FOR MANY YEARS  
FOR HERMETICALLY SEALED TO18, TO5, TO8 AND TO3 SEMICONDUCTOR  
PACKAGES, BUT IT IS ONLY RECENTLY THAT TECHNIQUES HAVE BEEN  
DEVELOPED THAT MAKE THE PROJECTION WELDING OF LARGER  
RECTANGULAR PACKAGES FOR HYBRID CIRCUITS A VIABLE PRODUCTION  
METHOD. BY USING THESE NEW WELDING TECHNIQUES FOR THE  
METHOD OF MANUFACTURING THICK FILM HYBRID CIRCUITS WITHOUT THE  
USE OF SOLDER HAS BEEN DEVELOPED  
Descriptors: INTEGRATED CIRCUIT PRODUCTION; THICK FILM  
CIRCUITS; HYBRID INTEGRATED CIRCUITS  
Identifiers: PROJECTION WELDING; METHOD OF MANUFACTURING;  
SOLDERLESS THICK FILM HYBRIDS  
02

Section Class Codes: B2540, B2522  
Unified Class Codes: SMCAB, SMCCAX

907989 B7620559 CHIP CAPACITOR MARKING  
SPARKES, R.  
VITRAMON LTD., HIGH WYCOMBE, ENGLAND  
ELECTRON. EQUIP. NEWS (GB) 15 MARCH 1976 Coden: EODAN  
WITH THE INCREASING USE OF MONOLITHIC CERAMIC CAPACITORS FOR  
HYBRID MICROCIRCUIT APPLICATIONS IN INDUSTRY THE NEED FOR A  
SUITABLE METHOD OF 'CHIP' CAPACITOR MARKING HAS BEEN  
IDENTIFIED. THE PAPER EXPLAINS IN BRIEF THE DEVELOPMENT OF  
SUCH A MARKING SYSTEM, WHICH IS NOW IN USE IN A WIDE VARIETY  
OF APPLICATIONS. THE SYSTEM IS OPTIMUM IN TERMS OF SIMPLICITY  
AND PRACTICALITY. IT PROVIDES CHIP USERS WITH A POSITIVE WAY  
TO IDENTIFY THE CAPACITANCE VALUE OF A CHIP CAPACITOR  
Descriptors: HYBRID INTEGRATED CIRCUITS; CAPACITORS;  
Identifiers: MONOLITHIC CERAMIC CAPACITORS; CHIP CAPACITOR  
MARKING; HYBRID MICROCIRCUITS  
02

907986 B7620556 INVESTIGATIONS INTO PRODUCTION STANDARDS FOR THICK FILM  
HYBRID CIRCUITS  
CASTRACCI, G.; GORLA, C.  
ALTA FREQ. (ITALY) VOL.45, NO.1 77-81 JAN. 1976  
Coden: ALFRAJ  
THE CIRCUITS DISCUSSED COVER A WIDE RANGE, FROM SIMPLE  
RESISTIVE NETWORKS TO VERY COMPLEX HYBRID CIRCUITS, FOR D.C.  
OPERATION AND AT SEVERAL HUNDRED MHZ. THE TOLERANCE ON THE  
NOISE, LESS THAN 1 MU/V, SUCH CIRCUITS REQUIRE EXPENSIVE  
PASTES TO PRODUCE THE CONDUCTING, RESISTIVE AND INSULATING  
COMPONENTS WHICH HAVE TO BE APPLIED AUTOMATICALLY. BESIDES THE  
STANDARDISATION OF COMPONENTS, IT IS ALSO NECESSARY TO  
STANDARDISE METHODS OF PRODUCTION. THE STANDARDISATION  
SOLDERING TECHNIQUES, THE STANDARDISATION OF FIVE DIFFERENT  
TYPES OF TERMINALS WITH AUTOMATIC MACHINERY FOR FITTING THEM,  
DISCUSSES THE STANDARDISATION OF COMPONENT DESIGN AND METHODS  
OF ASSEMBLY, USING CEMENTS WHICH FACILITATE ASSEMBLY AT THE  
RATE OF 2000 COMPONENTS PER HOUR, AND DEALS FINALLY WITH  
STANDARD METHODS OF CIRCUIT DESIGN  
Descriptors: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS  
Identifiers: THICK FILM CIRCUITS; HYBRID CIRCUITS;  
PRODUCTION STANDARDS; LOW TOLERANCES; LOW NOISE LEVEL;  
COMPONENTS STANDARDISATION; IMMERSION SOLDERING; ASSEMBLY;  
STANDARD CIRCUIT DESIGNS  
02

Section Class Codes: B2540, B2522  
Unified Class Codes: SMEAB, SMCCAX  
Language: ITALIAN

907985 07620555  
**A CONSISTENT TECHNIQUE FOR ASSEMBLING THIN FILM HYBRID CIRCUITS**  
 COTTA, R.  
 ALTA FREQ. (ITALY) VOL.45, NO. 1 72-77 JAN. 1976  
 Coden: ALFRAJ  
 UNENCAPSULATED ITEMS, ARE MOUNTED ON AREAS ELECTRICALLY GOLD PLATED TO A DEPTH OF 4 TO 5  $\mu$ M, USING EUTECTIC Au-51 SOLDERING ALLOYS AT 300 DEGREES, AIDED BY NITROGEN VETS AT 400 DEG. ETC. EPOXY RESIN METHODS OF ASSEMBLY HAVE BEEN INVESTIGATED BUT, DESPITE SOME ADVANTAGES, THEY CAUSE HIGH THERMAL AND ELECTRICAL RESISTANCE. THEY MAY CAUSE CORROSION AND ARE NOT SUITABLE FOR SMALL ITEMS, LESS THAN 0.35 MM SUP 2/. ULTRASONIC SOLDERING, WITH ALUMINIUM THREADS, CONTAINING 1 PERCENT SILICON HAS GIVEN VERY SATISFACTORY RESULTS. DESCRIBES METHODS OF ASSEMBLING CERAMIC CAPACITORS BY IMMERGING THEM IN A BATH OF SOLDER PRIOR TO SECURING THEM TO THE SUBSTRATE. BY REMELTING THE SOLDER AT THE TERMINALS AND METHODS OF MANUFACTURING AND ASSEMBLING THE OUTPUT TERMINALS. DESCRIBES THE PROTECTION ARRANGEMENTS, (CLEANING IN ALCOHOL VAPOUR, COATING WITH SILICONE RESIN AND POLYIMIDISATION IN AN OVEN) PRIOR TO BENCAPSULATION WITH EPOXY RESIN CONTAINING QUARTZ. FINALLY LISTS THE TESTS PERFORMED AFTER ASSEMBLY  
 Descriptors: THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; INTEGRATED CIRCUIT PRODUCTION  
 Identifiers: THIN FILM CIRCUITS; HYBRID CIRCUITS; CONSISTENT ASSEMBLING TECHNIQUE; GOLD PLATED; SOLDERING ALLOYS; NITROGEN JETS; ULTRASONIC SOLDERING; POLYMERISATION; ENCAPSULATION  
 02  
 Section Class Codes: B2540, B2524  
 Unified Class Codes: SWEAAB, SMEAAB  
 Language: ITALIAN

907227 87619551  
**FINANCIAL CONSCIOUSNESS IN THE MANUFACTURING OF THIN-FILM HYBRIDS**  
 LENINGTON, R. L.  
 HYCOMP INC., MAYNARD, MA, USA  
 IEEE TRANS. MANUF. TECHNOL. (USA) VOL. MET-5, NO. 1 13-17  
 MARCH 1976 Coden: IETMBC  
 ALMOST AN IMPOSSIBILITY IN A THIN-FILM HYBRID MICROCIRCUIT ACHIEVEMENT OF HIGH YIELDS AND LOW PRODUCTION COST ARE OPERATION WITHOUT THE COMBINATION OF A STRONG QUALITY ASSURANCE PROGRAM AND AN ACCURATE COST ACCOUNTING SYSTEM. THE PROCESS PROBLEMS ENCOUNTERED AS COMPONENT SIZE GETS SMALLER MAKING IT INCREASINGLY DIFFICULT TO MAINTAIN CIRCUIT INTEGRITY AND RESOLUTION ARE OUTLINED. THE NECESSITY OF MAINTAINING PROCESS CONTROLS WITH WELL EXECUTED QUALITY AND COST PROGRAMS ARE REVIEWED  
 Descriptors: INTEGRATED CIRCUITS; PRODUCTION; THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; QUALITY CONTROL SYSTEM; THIN FILM HYBRIDS; COST ACCOUNTING SYSTEM; THIN FILM HYBRIDS;  
 Identifiers: COST ACCOUNTING SYSTEM; THIN FILM HYBRIDS;  
 02  
 Section Class Codes: B1063, B2540  
 Unified Class Codes: ADG01, SMEAAB

907450 87619594  
**HYBRID THIN-FILM PULSE AMPLIFIER WITH SUBNANOSECOND RISE TIME**  
 KALISZ, J.; KAZMIERSKI, T.; MROZCHOWSKI, Z.  
 WILKOMIĘWA AKAD. TECHNICZNA, WARSAW, POLAND  
 ELEKTROININKA (POLAND) VOL. 17, NO. 1 32-4 1976 Coden: ENINIZ  
 THE DESIGN OF THE HYBRID THIN-FILM PULSE AMPLIFIER WITH 26 DB GAIN AND 400 PS RISE TIME IS PRESENTED. DESCRIPTION OF CONSTRUCTION AND TECHNOLOGY AND AN APPLICATION EXAMPLE IN A HIGHLY SENSITIVE 550 MHZ FREQUENCY DIVIDER ARE GIVEN (8 Refs)  
 Descriptors: PULSE AMPLIFIERS; THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; FREQUENCY DIVIDERS  
 Identifiers: SUBNANOSECOND RISE TIME; PULSE AMPLIFIER; CONSTRUCTION; TECHNOLOGY; HYBRID CIRCUIT; THIN FILM CIRCUIT; 26 DB GAIN; 400 PS RISE TIME; 550 MHZ FREQUENCY DIVIDER  
 02  
 Section Class Codes: B1040, B1070, B2524, B2540  
 Unified Class Codes: ETNAAB, ETNAAD, SMEAAB  
 Language: POLISH

898015 B7617117, C7612442  
**A 5-6-IN 20-LPI ELECTROLUMINESCENT DISPLAY PANEL**  
 BRODY, T.P.; FANG, CHEN, LUO; SZEPESI, Z.P.; DAVIES, D.H.  
 WESTINGHOUSE RES. LABS., PITTSBURGH, PA, USA  
 PH.D.C. SOC. INF. DISP. (USA) VOL.16, NO.3 158-67 1975  
 Coden: SIOPAA

THE AUTHORS HAVE BEEN WORKING ON A SOLUTION OF THE SOLID-STATE DISPLAY ADDRESSING PROBLEM WHICH CONSISTS OF BUILDING THE ADDRESSING CIRCUITS, AND EVENTUALLY, ALSO SCANNING, OR DECODING, CIRCUITS, DIRECTLY ON THE PANEL, AND FULLY INTEGRATED WITH THE PARTICULAR DISPLAY MEDIUM. THE TECHNIQUE UTILIZED FOR THIS APPROACH IS THAT OF A VACUUM-DEPOSITED THIN FILM TRANSISTOR MATRIX. THIS PAPER REPORTS ON THE DESIGN, CONSTRUCTION, AND PERFORMANCE OF A 120x10 ELEMENT EL PANEL, SUITABLE FOR ALPHANUMERIC, VECTROGRAPHIC, AND MONOCHROME TV IMAGE PRESENTATION. THE BASIC CIRCUIT, REPEATED AT EVERY PICTURE ELEMENT, CONSISTS OF AN X-Y-ADDRESSED LOGIC TRANSISTOR, A POWER TRANSISTOR, AND A STORAGE CAPACITOR. THE ENTIRE CIRCUIT WAS FABRICATED THROUGH MULTIPLE EVAPORATIONS IN A MULTISOURCE SYSTEM, USING ONE PUN-ION-DOSE CYCLE. THE FINISHED THIN-FILM CIRCUIT IS COVERED WITH A CRYSTAL EL-PHOSPHOR. AN EVAPORATED AL/PBO LAYER FORMS THE CONTINUOUS TOP ELECTRODE. THE ENTIRE DISPLAY PANEL IS FINALLY SEALED WITH A GLASS COVER PLATE (19-RETS)  
 Descriptors: DISPLAY SYSTEMS; ELECTROLUMINESCENCE; THIN FILM CIRCUITS  
 Identifiers: ELECTROLUMINESCENT DISPLAY PANEL; DISPLAY ADDRESSING; ADDRESSING CIRCUITS; THIN FILM TRANSISTOR MATRIX; LOGIC TRANSISTOR; POWER TRANSISTOR; STORAGE CAPACITOR; THIN FILM CIRCUIT  
 02 Section Class Codes: B2B98, C9640, B2524  
 Unifield Class Codes: SRMACC, XNGAA, SMCEAH

897750 C7611137  
**AUTOMATIC DIAGNOSIS OF LOGIC FAULTS IN CERAMIC CIRCUIT PACKS**  
 PATTON, R.L.  
 WESTERN ELECTRIC ENG. (USA) VOL.20, NO.1 16-19 JAN.  
 1976 Coden: WELEX  
 Discusses a computer-controlled system developed to automatically diagnose logic faults found on thin film ceramic circuit packs used in no. 1A, ESS and no. 4 TOLL ESS. The system consists of a computer-controlled test facility, probing station, and software programs using schematic trace analysis and on-line simulation which logic faults are contained on a failing circuit pack. The circuit pack is logically exercised, and failing outputs are logged with schematic trace analysis. Identification of failing outputs determines a set of gates on the circuit which must be probed. The gate failures are logged, then printed upon completion of the test sequence. Testing, for an average circuit pack, requires less than five minutes.  
 Descriptors: LOGIC TESTING; INTEGRATED CIRCUIT TESTING; AUTOMATIC TESTING; THIN FILM CIRCUITS; PRODUCTION TESTING;  
 SWITCHING SYSTEMS  
 Identifiers: LOGIC FAULTS; CERAMIC CIRCUIT PACKS; THIN FILM CERAMIC CIRCUIT PACKS; PROBING STATION; SOFTWARE PROGRAMS; SCHEMATIC TRACE ANALYSIS; LOGIC FAULTS DIAGNOSIS; AUTOMATIC DIAGNOSIS; TESTING; LOGIC TESTING; NO. 1A ELECTRONIC SWITCHING SYSTEMS; NO. 4 ELECTRONIC SWITCHING SYSTEMS; ATE; COMPUTER CONTROLLED TEST SYSTEM; ONLINE SIMULATION; LOGIC EXERCISING;  
 02 Section Class Codes: C7896, C9420, C7882  
 Unifield Class Codes: SMCEAH, VM2RAY, XGCAAH, ADGAAE, VMHEAE, FEGAC

891329 B7616088  
**AN OSCILLOSCOPE: VERTICAL-CHANNEL AMPLIFIER THAT COMBINES MONOLITHIC, THICK-FILM HYBRID, AND DISCRETE TECHNOLOGIES**  
 MILLARD, J.K.  
 HEWLETT-PACKARD J. (USA) VOL.27, NO.4 B-11 DEC. 1975  
 Coden: HJD0A  
 HEWLETT-PACKARD J. (USA) VOL.27, NO.4 B-11 DEC. 1975  
 10 TO MITIGATE MAINTENANCE AND CALIBRATION TIMES BY MINIMIZING THE NUMBER OF PARTS AND THE NUMBER OF ADJUSTMENTS, A HIGH DEGREE OF INTEGRATION WAS INCORPORATED IN THE VERTICAL AMPLIFIER SYSTEM OF THE MODEL 1740A OSCILLOSCOPE.  
 Descriptors: CATHODE-RAY OSCILLOSCOPES; WIDEBAND AMPLIFIERS; THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS  
 Identifiers: MODEL 1740A OSCILLOSCOPE; VERTICAL CHANNEL AMPLIFIER; HYBRID THICK FILM TECHNOLOGY; COMBINED IC TECHNOLOGIES  
 02 Section Class Codes: B4270, B1840, B2540, B2522  
 Unifield Class Codes: BECRAX, ETHAAB, SMEAAB, SMCCAX

898198 B7616666, C7611906  
**SMALL COMPUTER AIDED DESIGN AND DOCUMENTATION OF THICK FILM INTEGRATED CIRCUITS. II**  
 RIPA, G.; ALDRICH, M.  
 BIE, ELTEKTRONIKA TECHNOL., TANZSKE, HUNGARY  
 FIDYMICH, AND MIKROTECH. (HUNGARY) VOL.14, NO.12 375-80  
 TH. C. 1975 Coden: FIMKAY  
 THE PAPER SHOWS THE USE OF THE PROGRAM SYSTEM ELABORATED FOR THE TABLE CALCULATOR HP 9610, IN THE FIELD OF DOCUMENTATION FURTHER. SOME ALGORITHMS ARE DISCUSSED. THE POSSIBILITIES OF THE FUTURE DEVELOPMENT OF THE PROGRAM SYSTEM ARE EXAMINED.  
 Designers: THICK FILM CIRCUITS; COMPUTER-AIDED DESIGN  
 Identifiers: COMPUTER AIDED DESIGN; DOCUMENTATION; THICK FILM INTEGRATED CIRCUITS  
 02 Section Class Codes: B4522, C8B42  
 Unifield Class Codes: SMCCAX, WNEEAQ

891122 B7617799  
 A NEW 2700-CHANNEL RADIO RELAY SYSTEM  
 AZADEI, G.; VICINI, P.  
 G.F. TELECOMUNICAZIONI SPA.; MILAN, ITALY  
 MI-ROADIE SYST. NEWS (USA) VOL.5, NO.4 31. 33-4, 36-7  
 AUG-SEPT. 1975 Coden: MWIA9  
 UTILISING THE LATEST THIN FILM TECHNOLOGY, THIS 6.4-7.1 GHZ  
 RADIO TRANSMITTER FULLFILLS ALL CCIR REQUIREMENTS FOR HIGH  
 CAPACITY TELEPHONE RELAY EQUIPMENTS. LOW POWER CONSUMPTION  
 AND COMPACT SIZE ARE FEATURED. (1 reis)

Descriptors: THIN FILM CIRCUITS; RADIO RELAY SYSTEM; THIN FILM TECHNOLOGY; RADIO

TRANSMITTER; HIGH CAPACITY TELEPHONE RELAY; POWER CONSUMPTION;

COMPACT SIZE: 6.4 TO 7.1 GHZ

Section Class Codes: B3565, B2524

Unified Class Codes: FEKNAK, SMEAAH

890564 B7616865, C7609117  
 THE SMALL COMPUTER TRA-1 IN THE TECHNOLOGICAL DEVELOPMENT OF  
 THE RADIO ENGINEERING FACTORY REMIX  
 AMBROZ, J.; SZAKACS, B.  
 F. INSTITUTE, AND MIKROTECH, (HUNGARY)  
 OCT. 1975. Conten: ENHAW  
 VOL.14, NO.10 302-7  
 TECHNOLOGICAL DEVELOPMENT. WITHIN THIS THE PRODUCTION OF  
 INTEGRATED CIRCUITS IS ONE OF THE FIELDS OF APPLICATION FOR  
 SMALL COMPUTERS. BESIDE EXISTING CONFIGURATIONS, VARIOUS  
 PROGRAMS SUCCESSFULLY EMPLOYED IN THE FIELD OF PRODUCING  
 HYBRID THICK FILM INTEGRATED CIRCUITS ARE DESCRIBED IN THE  
 PAPER. SUCH AS PROGRAMS FOR TOPOLOGICAL DESIGN AND ARRANGEMENT  
 FOR DOCUMENTATION, THE FUNCTIONING OF THE PROGRAMS, THEIR  
 FIELDS OF APPLICATION, AND EXPERIENCE IN CONNECTION WITH THESE  
 TASKS ARE DISCUSSED.

890564 B7616865  
 THICK FILM ADVANCES SIMPLIFY COMPLEX HYBRID MODULE DESIGN  
 KIRBY, P.  
 ELECTRON. ENGINEERING (GB) VOL.48, NO.577 35-8 MARCH  
 1976 Coden: ELECA9

THE SUPERFICIAL SIMILARITY BETWEEN TODAY'S THICK FILM HYBRID

CIRCUITS AND SOME OF THE EARLY CIRCUITS PRODUCED ABOUT FIFTEEN

YEARS AGO IS MISLEADING, BECAUSE SIGNIFICANT PROGRESS HAS BEEN

MADE IN EVERY ASPECT OF THE SUBJECT. THE AUTHOR EXPLAINS HOW

THESE IMPROVEMENTS CAN BE BROUGHT TOGETHER TO PRODUCE A NEW

PANOE OF ADVANCED HYBRID MODULES WHICH CANNOT BE REALISED BY

ANY OTHER AVAILABLE TECHNIQUE

Descriptors: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS

Techniques: COMPLEX HYBRID MODULE DESIGN; THICK FILM

TECHNIQUES

Section Class Codes: B2540, B2522

Unified Class Codes: SMEAAH, SMCCAX

890564 B7616865, C7609117  
 THE SMALL COMPUTER TRA-1 IN THE TECHNOLOGICAL DEVELOPMENT OF  
 THE RADIO ENGINEERING FACTORY REMIX  
 AMBROZ, J.; SZAKACS, B.  
 F. INSTITUTE, AND MIKROTECH, (HUNGARY)  
 OCT. 1975. Conten: ENHAW  
 VOL.14, NO.10 302-7  
 TECHNOLOGICAL DEVELOPMENT. WITHIN THIS THE PRODUCTION OF  
 INTEGRATED CIRCUITS IS ONE OF THE FIELDS OF APPLICATION FOR  
 SMALL COMPUTERS. BESIDE EXISTING CONFIGURATIONS, VARIOUS  
 PROGRAMS SUCCESSFULLY EMPLOYED IN THE FIELD OF PRODUCING  
 HYBRID THICK FILM INTEGRATED CIRCUITS ARE DESCRIBED IN THE  
 PAPER. SUCH AS PROGRAMS FOR TOPOLOGICAL DESIGN AND ARRANGEMENT  
 FOR DOCUMENTATION, THE FUNCTIONING OF THE PROGRAMS, THEIR  
 FIELDS OF APPLICATION, AND EXPERIENCE IN CONNECTION WITH THESE  
 TASKS ARE DISCUSSED.

890564 B7616865  
 THICK FILM ADVANCES SIMPLIFY COMPLEX HYBRID MODULE DESIGN  
 KIRBY, P.  
 ELECTRON. ENGINEERING (GB) VOL.48, NO.577 35-8 MARCH  
 1976 Coden: ELECA9

THE SUPERFICIAL SIMILARITY BETWEEN TODAY'S THICK FILM HYBRID

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MADE IN EVERY ASPECT OF THE SUBJECT. THE AUTHOR EXPLAINS HOW

THESE IMPROVEMENTS CAN BE BROUGHT TOGETHER TO PRODUCE A NEW

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Descriptors: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS

Techniques: COMPLEX HYBRID MODULE DESIGN; THICK FILM

TECHNIQUES

Section Class Codes: B2540, B2522

Unified Class Codes: SMEAAH, SMCCAX

890565 B7616867  
 USING A ROTATIONAL VISCOMETER TO CHARACTERIZE THICK FILM  
 MATERIALS. II  
 DUFER, R.J.; STANLEY, E.C.  
 THICK FILM AND APPLICATION, INC., SADDLE BROOK, NJ, USA  
 THICK FILM CIRCUITS (USA) VOL.22, NO.1 23-7 JAN. 1976  
 Coden: ISCUFB  
 FUR PT. I SEE IBID., VOL.21, NO.13, P.31-6 (1975). MEASURING  
 PRINCIPLES ARE ILLUSTRATED WITH CASE HISTORIES. AMONG THE  
 FORMULATIONS COVERED ARE: A THICK FILM RESISTOR PASTE AND  
 THREE GOLD CONDUCTOR PASTES. NINE CASE STUDIES ARE PRESENTED  
 TO ILLUSTRATE THE MANNER IN WHICH A VISCOMETER CAN HELP PASTE  
 SUPPLIERS, AND TO ILLUSTRATE THE MANNER IN WHICH A VISCOMETER CAN HELP PASTE  
 SUPPLIERS. ATTEMPTING NEW FORMULATIONS OR

8841900 07613989, C7609577 HYBRID TECHNIQUES YIELD 4 GHZ LOGIC CIRCUITS FOR NTI'S PROPOSED 1-2 GB/S PCM COMM. SYSTEM JLE (JAPAN) NO.106 28-9 SEPT. 1975 Coden: JELEBR DISCUSSES THE PCM COMMUNICATION SYSTEM AND THE NEED FOR ULTRA HIGH-SPEED LOGIC. THE EFFECT OF PACKAGE PARASITICS, THE CHIP TRANSISTORS, LOGIC, THE MANUFACTURE OF THE THIN-FILM HYBRID ICS AND FUTURE PROBLEMS ARE CONSIDERED. Discretors: LOGIC CIRCUITS; DIGITAL COMMUNICATION SYSTEMS; HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS; DIGITAL INTEGRATED CIRCUITS; PULSE-CODE MODULATION Identifiers: 4 GHZ LOGIC CIRCUITS; PCM COMMUNICATION SYSTEM; PACKAGE PARASITICS; CHIP TRANSISTORS; PCB'S; MULTILAYER BOARDS; LAMINATES; HIGH SPEED LOGIC; THIN FILM HYBRID IC; 2 GB/S PCM COMMUNICATION SYSTEM 02 Section Class Codes: B3560, B2524, B1870, C9260, B2540 Unified Class Codes: FKA9A, SMC9A, ETNAAP, XEGAAP, SMEAAP

883111 07612684, C7607723 AUTOMATED LASER TRIMMING WITH LINEAR MOTOR BEAM POSITIONING CIRCUITS MANUF. (USA) VOL.15, NO.10 46-53 OCT. 1975 Coden: CAFIAF Describers: LASER TRIMMING EQUIPMENT FOR THICK AND THIN FILM RESISTORS AND HYBRID CIRCUIT CARDS Discretors: LASER BEAM MACHINING; INTEGRATED CIRCUIT PRODUCTION; AUTOMATIC CONTROL Identifiers: LINEAR MOTOR BEAM POSITIONING; AUTOMATED LASER TRIMMING; THICK FILM CIRCUITS; THIN FILM CIRCUITS 02 Section Class Codes: C7862, B2520, B2380, B1267 Unified Class Codes: VMM9E, SMC9A, EGM9A, ADGMAT

879766 07613054 HYBRID TECHNOLOGY APPLIED TO THE CHIP INTERCONNECTION PROBLEM KIRBY, P.L. MELWYN ELECTRIC LTD., BEDFORD, ENGLAND MICROELECTRON. AND RELIAB. (GB) VOL.14, NO.4 369 1975 Coden: MELAS SEMINEX '75, 24-28 FEB. 1975, LONDON, ENGLAND Abstract: ONLY GIVEN SUBSTANTIALLY AS FOLLOWS. REVIEWS EXISTING TECHNIQUES AND ILLUSTRATE POSSIBLE FUTURE DEVELOPMENT IN BOTH THIN AND THICK FILM INTERCONNECTION TECHNOLOGIES. INTERESTING DEVELOPMENT INVOLVING THE USE OF VERY THIN COPPER LAYERS ON P.C. BOARDS POINTS THE WAY TO HIGH DENSITY DIRECT CHIP ATTACHMENT CIRCUITS FOR LSI CHIPS WHICH COULD ALLOW INTERCONNECTION SYSTEM TO THE USE OF CERMETS ON CERAMIC SUBSTRATES. Descretors: THICK FILM CIRCUITS; THIN FILM CIRCUITS; PRINTED CIRCUITS; MONOLITHIC INTEGRATED CIRCUITS; LARGE SCALE INTEGRATION; HYBRID INTEGRATED CIRCUITS Identifiers: CHIP INTERCONNECTION; EXISTING TECHNIQUES; THICK FILM INTERCONNECTION TECHNOLOGIES; VERY THIN COPPER LAYERS; HIGH DENSITY INTERCONNECTION CIRCUITS; LSI; DIRECT CHIP ATTACHMENT; HYBRID TECHNOLOGY; THIN FILM INTERCONNECTION 06 Section Class Codes: B2540, B2564, B2528, B2230 Unified Class Codes: SMEAB, SMEAN, SMC9A, SEMAAW

802111 07613003, C7607433 MATERIALS, I. A ROTATIONAL VISCOMETER TO CHARACTERIZE THICK FILM DRIFTER, R.J.; STANLEY, E.C. THIN-FILM AND APPLICATION, HAAKE INC., SADDLE BROOK, NJ, USA Coden: FFCDFP I. FILM/CIRCUITS (USA) VOL.21, NO.13 31-6 DEC. 1975 Discusses the use of a modern range rotational viscometer to obtain characteristic flow curves on inks and pastes that are used in microelectronic circuits. Inherent rheological concepts and definitions are summarized. The measuring principles are illustrated with a number of case studies on actual thick film pastes. Finally, concepts useful to formulators of these materials are discussed. (10 refs) Descretors: VISCOMETERS; MATERIALS TESTING Identifiers: ROTATIONAL VISCOMETER; THICK FILM MATERIALS; CHARACTERISTIC FLOW CURVES; INKS; PASTES; RHEOLOGICAL CONCEPTS

Language: FRENCH

879763 B7613051  
A VERSATILE TAY/SUB 2/N-WAU/S10/SUB 2//AL/S10/SUB 2// THIN FILM HYBRID MICROCIRCUIT METALLISATION SYSTEM

HARDY, R.E.  
SANDIA LABS., ALBUQUERQUE, NM, USA

TELE TRANS., PARIS, HYBRIDS AND PACKAG. (USA)

NO. 4 263-72 DEC. 1975. Cordon: TEPHA

VOL. PHP-11.

A VERSATILE THIN FILM METALLISATION TECHNIQUE IN WHICH BOTH GOLD AND ALUMINIUM CAN BE INCORPORATED ON SAPPHIRE OR FINE GRAINED ALUMINA SUBSTRATES IN A TWO LEVEL METALLISATION SYSTEM WITH THIN FILM RESISTORS IS DESCRIBED. THE METALLISATION SYSTEM PERMITS EFFECTIVE INTERCONNECTION OF A MIXTURE OF DEVICES HAVING BOTH GOLD AND ALUMINIUM TERMINATIONS WITHOUT CREATING UNDESIRABLE GOLD-ALUMINIUM INTERFACES. DEVICES CAN BE ATTACHED BY EPOXY OR SILICONE DIRECTLY ON THE CIRCUITRY, PROCESSING TEMPERATURES UP TO 400 DEGREES CAN BE TOLERATED, FOR SHORT TIMES WITHOUT EFFECT ON BONDABILITY, RESISTOR, CONDUCTOR, AND INSULATOR CHARACTERISTICS. THUS, PERMITTING SILICON-GOLD EUTECTIC DIE ATTACHMENT, COMPONENT SOLDERING, AND HIGHER TEMPERATURES DURING LEAD BONDING. TESTS CONDUCTED ON SPECIAL TEST PATTERN CIRCUITS INDICATE GOOD STABILITY OVER THE TEMP RANGE -55 DEGREES TO +150 DEGREES. AGING STUDIES SHOWED NO DEGRADATION IN CHARACTERISTICS IN TESTS OF 500 HOURS DURATION AT 150 DEGREES. 125 Ref's.

Descriptors: HYBRID INTEGRATED CIRCUITS; METALLISATION: THIN FILM CIRCUITS; TAY/SUB 2/N-WAU/S10/SUB 2//AL/S10/SUB 2//; HYBRID MICROCIRCUIT; VERSATILE THIN FILM METALLISATION TECHNIQUE; COMPONENT: SOLDERING; LEAD BONDING; SI-AU EUTECTIC DIE ATTACHMENT

02

Section Class Codes: B2540, B2524

Unified Class Codes: SMEAB, SMECAH

879760 B7613049  
CHOOSING THICK FILM HYBRID MICROELECTRONICS

STC-CANON COMPONENTS PTY LTD., LIVERPOOL, ENGLAND

STONS, A.  
AUST. ELECTRON. ENG. (AUSTRALIA) VOL. B, NO. 5 19-24 MAY 1975. Cordon: AVE010  
DISCUSSES THE ADVANTAGES, THE TECHNOLOGY AND APPLICATIONS OF THICK-FILM CIRCUITS. A SUMMARY OF THICK-FILM COMPONENT PARAMETERS IS GIVEN. THE ADVANTAGES OF GREATER RELIABILITY, SMALL SIZE, AND LOWER INITIAL DEVELOPMENT COSTS OVER DISCRETE COMPONENT DESIGN ARE SHOWN  
Descriptors: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; INTEGRATED CIRCUIT PRODUCTION; RELIABILITY; ECONOMICS; Identifiers: HYBRID MICROELECTRONICS; COMPONENT PARAMETERS; TECHNOLOGY; INTEGRATED CIRCUIT PRODUCTION

02

Section Class Codes: B2540, B2524, B1263

Unified Class Codes: SMEAB, SMECAH, ADGDA

879742 B7613006  
MATERIAL CHARACTERISATION OF Ti-Cu-Ni-Au (TCNA)-A NEW LOW COST THIN FILM CONDUCTOR SYSTEM

MORABITO, J.M.; THOMAS, J.H.; LEKH, N.G.  
TELE TRANS., ALLENDALE, PA, USA

NO. 4 25-3-62 DEC. 1975. Cordon: IEPHA  
VOL. PHP-11.

THIS PAPER DISCUSSES A Ti-Cu-Ni-Au (TCNA) SUBSTITUTE WHICH ELIMINATES THE USE OF Pd AND REDUCES THE THICKNESS OF GOLD NECESSARY FOR A .005 OHMS PER SQUARE SHEET RESISTANCE FROM 5 MUM TO .2 MUM. THE REDUCTION IN GOLD THICKNESS CAN RESULT IN CONSIDERABLE COST SAVINGS. THE TCNA FILMS WERE DEPOSITED BY PLATING, I.E., ELECTRON GUN EVAPORATION OF Ti AND Cu FOLLOWED BY THE PLATING OF Cu-Ni-Au (23A Ref).  
Descriptors: CONDUCTORS (ELECTRIC); THIN FILM CIRCUITS; INTEGRATED CIRCUIT PRODUCTION (ELECTRIC); THIN FILM CONDUCTOR SYSTEM; PLATING; ELECTRON GUN EVAPORATION

02

Section Class Codes: B2524, B2540

Unified Class Codes: SMEAB

879761 B7613049  
THICK FILM HYBRID TECHNOLOGY: LOW-COST HIGH-POWER MODULES  
ELECTRON. AND MICROELECTRON. IND. (FRANCE) NO.212 45  
15. MAY. 1975. Cordon: ETCIAS  
DISCUSSES THE USE OF DUPONT 9061 ALLOY (OF SILVER AND PALLADIUM) AS A CHEAP REPLACEMENT FOR GOLD AND PLATINUM AS MATERIALS FOR USE IN THICK FILM CIRCUIT BOARD MANUFACTURE. THE NEW ALLOY WITH 96PERCENT ALUMINIUM TRACKS CAN BE PROCESSED IN AIR AT 760C INSTEAD OF IN CONTROLLED ATMOSPHERES AT 1600C AND WAS PROVED SATISFACTORY IN POWER REGULATING MODULES CONTROLLING UP TO 3.75 KW  
Descriptors: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS; SILVER ALLOYS; PALLADIUM ALLOYS; MODULES; IDENTIFIERS: DUPONT 9061 ALLOY; POWER REGULATING MODULES; HYBRID CIRCUITS; PROCESSING IN AIR; LOW COST MODULES; HIGH POWER MODULES; AG-PD ALLOY; AU-DT REPLACEMENT; 96PERCENT AL TRACKS; THICK FILM CIRCUITS; PCD MANUFACTURE

02

Section Class Codes: B2540, B2524, B1263

Unified Class Codes: SMEAB, SMECAH, ADGHA, ETGAA

**879740** B7613004  
 CHEMICAL ANALYSES OF THICK-FILM GOLD CONDUCTOR INKS  
 HUTCH, T. I.; WHITAKER, H.M.; GOYISH, B.L.  
 RCA DAVID SARNOFF RES. CENTER, PRINCETON, NJ, USA  
 IEEE TRANS. PARTS, HYBRIDS, AND PACKAG. (USA) VOL.PHP-11,  
 NO.4 24B-53 DEC. 1975 Coden: IEPHA  
 THE INORGANIC CONSTITUENTS OF SEVENTEEN COMMERCIAL  
 GOLD-BASED CONDUCTOR INKS HAVE BEEN CHEMICALLY ANALYSED IN  
 DETAIL. A VARIETY OF TECHNIQUES WERE EMPLOYED INCLUDING A  
 PRECURSOR BAKE OF INK SAMPLES IN OXYGEN, WHICH BURNED OFF THE  
 ORGANIC VEHICLES, FOLLOWED BY WET CHEMICAL ANALYSIS TO  
 DETERMINE THE PROPORTION OF GOLD IN THE INORGANIC SOLIDS OF  
 THE INKS. SOLIDS MASS SPECTROMETRY AND OPTICAL EMISSION  
 SPECTROMETRY WERE USED TO DEFINE THE RELATIVE AMOUNTS OF OTHER  
 ELEMENTS PRESENT. ATOMIC ABSORPTION SPECTROSCOPY WAS THEN  
 EMPLOYED, WHERE APPLICABLE, TO MORE PRECISELY DEFINE THE  
 PROPORTIONS OF INORGANIC BINDER CONSTITUENTS IN THE INKS. THE  
 PAPER BRIEFLY DESCRIBES EACH OF THE ANALYTICAL METHODS USED  
 AND REFERS TO MORE DETAILED DESCRITIONS OF EACH METHOD.  
 DESCRITIONS ARE GIVEN OF INNOVATIVE LABORATORY TECHNIQUES  
 USED TO PERFORM THE STUDY AND WITH THE OTHER MATERIAL GIVEN  
 AND REFERENCED SHOULD ENABLE THE READER TO DUPLICATE THE  
 ANALYSES. (17 REF.)  
 Descriptors: THICK FILM CIRCUITS; CHEMICAL ANALYSIS;  
 CONDUCTORS (ELECTRIC) IDENTIFIERS: PRECURSOR BAKE; WET CHEMICAL ANALYSIS; OPTICAL  
 EMISSION SPECTROMETRY; THICK FILM Au CONDUCTOR INKS; CHEMICAL  
 ANALYSIS; SOLID MASS SPECTROMETRY; ATOMIC ABSORPTION  
 SPECTROSCOPY

02  
 Section Class Codes: B2522  
 Unified Class Codes: SMCCAX

## ATMOSPHERE: PROCESSING AT 850 TO 900 DEGREES C

**02**  
 Section Class Codes: B2210  
 Unified Class Codes: SMCCAX, SEAS  
 Language: FRENCH

**879737** B7613000  
 PHOTO-CHEMICAL METHODS FOR IC MANUFACTURING  
 LUPINSKI, W.  
 ELEKTRONIKA (POLAND) VOL.16, NO.11 451-5 1975 Coden:  
 EKN102  
 THE PAPER PRESENTS NEW ACHIEVEMENTS IN THE FIELD OF  
 PHOTO-CHEMICAL METHODS AS APPLIED FOR THE TECHNOLOGY OF  
 INTEGRATED CIRCUITS, THICK- AND THIN-FILM CIRCUITRY AND SHAPE  
 ETCHING, AND TO PRINTED CIRCUITS. (17 Ref.)  
 Descriptors: INTEGRATED CIRCUITS; THIN FILM  
 CIRCUITS; THICK FILM CIRCUITS; PHOTOLITHOGRAPHY; MONOLITHIC  
 INTEGRATED CIRCUITS; ETCHING; PRINTED CIRCUITS  
 IDENTIFIERS: ETCHING; IC MANUFACTURE; PHOTOCHEMICAL  
 PROCESSING; THICK FILM CIRCUITS; THIN FILM CIRCUITS

02  
 Section Class Codes: B2222, B223C, B2528, B2524  
 Unified Class Codes: SMCCAX, SEMAA\*, SMCCAK, SMCEAH  
 Language: POLISH

**879738** B7613001  
 N-<sup>4</sup>P-PRECIOUS METALS FOR REPLACING GOLD IN THICK FILM INKS  
 INOF, M.; KERSZMAN, M.  
 ELECTRON. AND MICROELECTRON. IND. (FRANCE) NO.212 46-7  
 15 NOV 1975 Coden: ENUCIA'S  
 DESCRIPTION: THE CERIALLO SYSTEM OF THICK FILM CIRCUIT  
 MANUFACTURE USING COPPER OR NICKEL BEARING INKS WITH GLASS  
 SEALING MATERIAL AND DIELECTRICS ALL PROCESSED AT BETWEEN 650  
 AND 800°C IN A NITROGEN ATMOSPHERE. THE PARTIAL PRESSURE OF  
 OXYGEN IS HELD TO LESS THAN 4 ppm. USING THESE TECHNIQUES THE  
 USE OF GOLD AND OTHER PRECIOUS METALS CAN BE AVOIDED. THE  
 CONNECTIONS ADHERE WELL TO NEARLY ALL COMMONLY USED SUBSTRATES  
 AND RESISTANCES WITH TEMPERATURE COEFFICIENTS OF LESS THAN 150  
 ppm/c. FOR VALUES OF BETWEEN 50 AND 3000 OHM/SQUARE CAN BE LAID  
 DOWN. IT IS ANTICIPATED THAT THESE CHEAP MATERIALS WILL AID  
 THE EXPANSION OF THICK-FILM TECHNOLOGIES.  
 Descriptors: THICK FILM CIRCUITS; THICK FILM RESISTORS  
 IDENTIFIERS: THICK FILM INKS; CERIALLO SYSTEM; THICK FILM  
 CIRCUITS; MANUFACTURE; GLASS SEALING MATERIAL; THICK FILM  
 CIRCUITS; (17 Ref.)

B7612997      B7612997  
 THE DETECTION AND ANALYSIS OF THERMALLY INDUCED  
 DISPLACEMENTS IN POWERED MICROELECTRONIC CIRCUITS UTILIZING  
 HOLOGRAPHIC INTERFEROMETRY  
 HAYES, E.S.; FREDRICH, O.M., JR.; DOUGAL, A.A.  
 Report No.: 11-167A509-R-75-1061;  
 TEXAS, AUSTIN, USA;  
 MARCH, 1975  
 A METHOD OF PRODUCING HOLOGRAMS OF MICROSCOPIC SUBJECTS WAS  
 DEVELOPED IN WHICH A MAGNIFYING LENS SYSTEM WAS INTRODUCED  
 DURING THE RECORDING PHASE. GOOD QUALITY HOLOGRAMS WERE REALIZED  
 OF THREE BASIC TYPES OF ELECTRONIC CIRCUITS, NAMELY: AN  
 INTEGRATED CIRCUIT, A HYBRID MICROCIRCUIT, AND A DISCRETE  
 CIRCUIT. DOUBLE EXPOSURE HOLOGRAMS WERE THEN  
 OBTAINED OF EACH CIRCUIT. THE VARIOUS MODES OF EXPANSION FOR  
 EACH CIRCUIT WERE EXPLAINED BY RELATING THE OBSERVED FRINGE  
 PATTERNS TO THE CIRCUIT GEOMETRIES AND THE THERMAL HEATING  
 DISPLACEMENTS IMPOSED  
 DISPLACERS: HOLOGRAPHIC INTERFEROMETRY: INTEGRATED CIRCUIT  
 TESTING  
 Interferers: THERMALLY INDUCED DISPLACEMENTS; POWERED  
 MICROELECTRONIC CIRCUITS; HOLOGRAPHIC INTERFEROMETRY;  
 HOLOGRAMS; MAGNIFYING LENS SYSTEM; ELECTRONIC CIRCUITS;  
 INTEGRATED CIRCUIT: HYBRID MICROCIRCUIT: DISCRETE COMPONENT

11 Section Class Codes: D2520, B2540, B1269  
12 Unified Class Codes: SMAAL, SMEAB, ADGMAE  
13 Availability: NTSL, SPRINGFIELD, VA, 22161, USA  
14 CIRCUIT

791322 B1612537 TEMPERATURE STABILITY OF THE Q-FACTOR OF AN ACTIVE BANDPASS C FILTER WITH A NULLING CIRCUIT IN THE FEEDBACK LOOP  
 BRESHTENIN, B. SH. VOROB'EV, A. M.  
 1125, VUZ RADIOTELEKTRON, (USSR) VOL.1B, NO.8 59-63 AUG.  
 1975. Coden: IAUZUS.

AN EQUATION IS DERIVED FOR THE INSTABILITY OF THE Q-FACTOR FOR AN ACTIVE RC FILTER, RESULTING FROM CHANGES OF DIELECTRIC LOSSES WITH CAPACITORS OF THE FILTER. A FORMULA IS ALSO OBTAINED FOR THE DESIGN OF FILTERS WITH A STABLE Q-FACTOR. THE EQUATION IS DERIVED EXPERIMENTALLY. USING A DISTRIBUTED RC FILTER, WITH A T- $\Delta$ /SUB 2/OSUB 5/-AL STRUCTURE, AT A NULLING FREQUENCY OF 3200 Hz, GOOD AGREEMENT IS OBTAINED BETWEEN THE TWO SETS OF RESULTS. (3 Refs.)

Contributors: ACTIVE FILTERS; BAND-PASS FILTERS; THIN FILM IDENTIFIERS; Q-FACTOR; DISTRIBUTED PARAMETER NETWORKS; NULLING FEEDBACK LOOP; ACTIVE BANDPASS RC FILTER; NULLING STABILITY; DIELECTRIC LOSSES; TEMPERATURE

02 Section Class Codes: B1880, B2524, B1650  
Unified Class Codes: ETRAAM, SINCEAH, ERMAAH  
Language: RUSSIAN

871529 B7609040, C7606195  
 INPUT/OUTPUT TECHNIQUES FOR COMPUTERIZED HYBRID-MICROCIRCUIT  
 MASKING SHEETS, L.R.  
 ELECTRONICS ENGNG. DEPT., BENDIX CORP., KANSAS CITY, MO, USA  
 MICROELECTRONICS (GB) VOL. 5, NO. 3 50-6 1974 Coden:  
 THIS PAPER DESCRIBES CERTAIN INPUT/OUTPUT TECHNIQUES THAT  
 HAVE BEEN DEVELOPED TO SIMPLIFY THE COMPUTERIZED FABRICATION  
 OF PHOTOMASKS FOR THIN-FILM HYBRID MICROCIRCUITS. THESE  
 TECHNIQUES MINIMIZE THE AMOUNTS OF DATA THAT ARE REQUIRED FOR  
 SPECIFYING A PHOTOMASK AND EXPEDITE THE PREPARATION OF ARTWORK  
 FOR SUCH MASKS. SPECIAL PROGRAM SUBROUTINES NAME THE SYSTEM  
 SUITABLE FOR USE WITH EITHER OF TWO GRAPHIC-OUTPUT DEVICES,  
 THE CEDRIEN BLOTTER AND THE CALCOMP 718 PLOTTER. AN  
 INTERACTIVE-GRAPHICS INPUT IS CURRENTLY UNDER STUDY (3 Refs.)  
 Descriptors: HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS;  
 MASKS; ELECTRONICS APPLICATIONS; COMPUTERS  
 Identifiers: PHOTOMASKS; ARNOX; COMPUTER AIDED FABRICATION  
 : THIN FILM HYBRID CIRCUITS; GRAPHIC OUTPUT DEVICES  
 02  
 Section Class Codes: B2540, B2524, CBB42  
 Unified Class Codes: SMEAB, SMCEAH, WMEAO

871512 B7609044, C7606178  
 SMALL COMPUTER AIDED DESIGN AND DOCUMENTATION OF THICK FILM  
 INTEGRATED CIRCUITS. I.  
 RIMKA, G.; ALBRECHT, M.  
 D.E. ELÉCTRONIQUE TECHNOLOGIA TANSZÉK, BUDAPEST, HUNGARY  
 ELEMTRONIČNO MIKROTECH., (HUNGARY) VOL. 14, NO. 9 269-74  
 SEPT. 1975 Coden: FRKAY  
 PRESENTS A PROGRAM SYSTEM ELABORATED FOR A TABLE CALCULATOR  
 TYPE HP 9610 FACILITATING THE DESIGN AND DOCUMENTATION OF  
 THICK FILM INTEGRATED CIRCUITS. THE FIRST PART SHOWS THE USE  
 OF THE PROGRAM SYSTEM AT DESIGNING. THE DESIGNER RECEIVES A  
 GRAPHIC DISPLAY OF THE DESIGNED RESISTORS. FURTHER OF THE  
 HYBRID ELEMENTS AND THE SUBSTRATE. THESE CAN BE USED AS  
 AUXILIARY DATA AT DESIGNING THE TOPOLOGY  
 D.C.-CIRCUITS. COMPUTER-AIDED DESIGN; TOPOLOGY; ELECTRONICS  
 APPLICATIONS OF COMPUTERS; THICK FILM CIRCUITS  
 Identifiers: COMPUTER AIDED DESIGN; DOCUMENTATION; THICK  
 FILM INTEGRATED CIRCUITS; TABLE CALCULATOR TYPE HP 9610;  
 GRAPHIC DISPLAY; LAYOUT DESIGN  
 02  
 Section Class Codes: B2522, CBB42  
 Unified Class Codes: SMEAC, WMEAQ  
 Language: HUNGARIAN

UNIV. OF TECHNOLOGY, LOUGHBOROUGH, ENGLAND  
 MICROELECTRONICS (GB) VOL. 7, NO. 1 40-4 5EPT. 1975  
 Coden: MIECB9  
 A NUMBER OF VOLTAGE CONTROLLED OSCILLATORS USE NON-LINEARITY  
 TO CONVERT FIXED AMPLITUDE TRIANGULAR WAVES TO SINE WAVES.  
 SINCE THIS CONVERSION IS A FUNCTION OF AMPLITUDE ONLY (TO A  
 FIRST APPROXIMATION), THE SINE WAVE FREQUENCY MAY BE ALTERED  
 AT WILL BY CHANGING THE FREQUENCY OF THE TRIANGULAR WAVE. THE  
 SUBJECT OF THIS PAPER IS AN ALTERNATIVE METHOD OF PRODUCING  
 SINE WAVES. THE FREQUENCY MAY BE PROGRAMMED EITHER DIGITALLY  
 OR IN AN ANALOGUE CARRIER AND IT MAY BE CHANGED WITHIN A SMALL  
 FRACTION OF A CYCLE. USING THIS TECHNIQUE IT IS POSSIBLE TO  
 GENERATE MULTIPLE OUTPUTS EACH OF A DIFFERENT PHASE. OF  
 PARTICULAR INTEREST TO COMMUNICATIONS ENGINEERS IS THE ABILITY  
 TO PRODUCE PHASE QUADRATURE SIGNALS. THE TECHNIQUE REQUIRES A  
 RELATIVELY LARGE NUMBER OF RESISTORS ALL HAVING A PRECISE  
 RELATIONSHIP. IT IS, THEREFORE, PARTICULARLY SUITABLE FOR  
 CONSTRUCTION USING THICK FILM TECHNIQUES  
 Descriptors: OSCILLATORS; FREQUENCY CONTROL; PROGRAMMED  
 CONTROL; THICK FILM CIRCUITS  
 Identifiers: PHASE, CONTINUOUS, PROGRAMMABLE OSCILLATOR;  
 MULTIPLE OUTPUTS; PHASE QUADRATURE SIGNALS; THICK FILM  
 TECHNIQUES  
 02  
 Section Class Codes: B1050, B2522, C7424  
 Unified Class Codes: ETKAAR, SMCCAX, VGCXAD

869294 B7610380  
 ACTIVE TONE CONTROL IN TANTALUM THIN FILM TECHNOLOGY  
 DOSSESMANN, W.  
 SIEMENS AG, BERLICH BAUELEMENTE, GRUNDLAGENENTWICKLUNG,  
 MUNICH, GERMANY  
 ELEKTRONIK INT. (AUSTRIA) NO. 10 350-3 1975 Coden:  
 EKITA  
 IN SIMPLE L.F. AMPLIFIERS, THE HIGH AND LOW PASS TONE  
 CONTROL SECTIONS ARE NOT ADEQUATELY DECOUPLED, AND THE  
 MID-FREQUENCY RANGE IS AFFECTED BY BOTH POTENTIOMETERS. A  
 SYNTHESIS PROCESS PERMITS THE DESIGN OF AN ACTIVE BANDPASS  
 FILTER IN WHICH THE MID-FREQUENCY IS CONSTANTLY VARIABLE WITH  
 NO ALTERATION IN THE BANDWIDTH, USING TWO FOUR-POLES. TAA 765  
 AND TAA 221 OP AMPS, IN A TANTALUM THIN FILM CIRCUIT. THE  
 SPECIFICATION ATTAINABLE IS: 30 Hz TO 20 kHz; MAX RISE/FALL +OR- 10 dB; I/P 10 V EFF;  
 I/P 2.10K (1 Ref.)  
 Descriptors: THIN FILM CIRCUITS; ACTIVE FILTERS; BAND-PASS  
 FILTERS; OPERATIONAL AMPLIFIERS; TANTALUM  
 Identifiers: ACTIVE TONE CONTROL; ACTIVE BAND PASS FILTER;  
 OPERATIONAL AMPLIFIERS; CONSTANTLY VARIABLE MILD FREQUENCY; TA  
 THIN FILM TECHNOLOGY  
 02  
 Section Class Codes: B3780, B1B40, B2524, B1B60  
 Unified Class Codes: FKRAAF, ETAAAB, SMCEAH, ETAAAM  
 Language: GERMAN

870760 B7608347, C7605411  
 A PHASE CONTINUOUS PROGRAMMABLE OSCILLATOR  
 MORAN, P.L.  
 DEPT. OF ELECTRONIC AND ELECTRICAL ENGG., LOUGHBOROUGH

869109 87610279  
NEW BLACK-AND-WHITE MODULAR CHASSIS  
RIECHMANN, W.  
FUNKCHAU (GERMANY) VOL.47, NO.22 109-11 24 OCT. 1975  
Code: FUSHA2 S.M. MONOCHROME CHASSIS (FOR TV  
DEFIBRILLATORS: BLAUPUNKT'S. WHICH ALL COMPONENTS, EXCEPT THE POWER SUPPLY AND  
RECIPIENT, ARE CONSTRUCTED EITHER AS THICK FILM  
MODULES AS SEPARATE MODULES CONSTRUCTED IN TERMS OF MECHANICAL  
CIRCUITS OR AS ICS. BRIEFLY DESCRIBED IN TERMS OF MECHANICAL  
CONSTRUCTION AND ELECTRONIC CIRCUITRY ARE THE HORIZONTAL  
OUTLINE STAGE AND H.V. RECTIFIER (NON-MODULAR), AND THE  
VERTICAL DEFLECTION MODULE.  
Descriptors: TELEVISION RECEIVERS; THICK FILM CIRCUITS;  
RECTIFYING CIRCUITS; MODULES  
Identifiers: MODULAR CHASSIS; MONOCHROME CHASSIS; TV  
RECEIVERS; THICK FILM CIRCUITS; MECHANICAL CONSTRUCTION;  
ELECTRONIC CIRCUITRY; HORIZONTAL OUTPUT STAGE; VERTICAL  
DEFLECTION MODULE; HV RECTIFIER  
02  
Section Class Codes: B3740, B1265, B2522, B1030  
Unified Class Codes: FMGAAH, SMCCAX, ETGAA  
Language: GERMAN

869109 87610279  
CERAMICS  
Identifiers: LASER BEAM MACHINING; CERAMIC SUBSTRATES;  
HYBRID MICROCIRCUITS; PRODUCTION MACHINING  
02  
Section Class Codes: B2910, B2540, B2610, B1269  
Unified Class Codes: EGMAA, SNEAAB, SNCAY, ADGMAE

869164 87609036  
SOLDERING HYBRID MICROCIRCUITS WITH PASTE SOLDER  
DERNIER, D.  
RES. AND DEV., KESTER SOLDER DIV., LITTON SYSTEMS, CHICAGO,  
IL, USA  
Code: 15CBUF  
Descriptor: HYBRID INTEGRATED CIRCUITS; INTEGRATED CIRCUIT  
Identifiers: HYBRID MICROCIRCUITS; PASTE SOLDER  
02  
Section Class Codes: B2540  
Unified Class Codes: SNEAAB

869162 87609034  
REWORK TECHNIQUE  
POST-MORTEM TESTS  
YOUNG, R. D. A.; LENHARDT, B.W.  
DENDIX CORP., KANSAS CITY, MO, USA  
INSUL./CIRCUITS (USA) VOL.21, NO.12 21-2 NOV. 1975  
Code: 15CBUF  
Descriptor: HYBRID INTEGRATED CIRCUITS (HIC). SEVERAL REASONS MAY DICTATE THE  
BEAM-LEAD DEVICES (BLD) TO SUBSTRATES DURING ASSEMBLY OF  
HYBRID MICROCIRCUITS (HMC). SEVERAL REASONS MAY DICTATE THE  
NEED TO REMOVE AND REPLACE ONE OR MORE OF THESE BLD. A  
SCHAVE-OFF TECHNIQUE GENERALLY USED THROUGHOUT INDUSTRY CAN  
SELDOM REMOVE THE BLD INTACT AND UNARMAGED. HOWEVER, A  
TECHNIQUE HAS BEEN DEVELOPED THAT CAN BE USED TO REMOVE BLD  
FROM A HYBRID AND MAINTAIN DEVICE INTEGRITY FOR POST-MORTEM  
TESTS. THE TECHNIQUE DOES NOT DAMAGE SUBSTRATE METALLIZATION  
02  
ON THE HYBRID CIRCUIT  
Identifiers: HYBRID INTEGRATED CIRCUITS; BEAM-LEAD DEVICES  
Descriptor: HYBRID MICROCIRCUITS; THERMOCOMPRESS BONDING  
Identifiers: HYBRID MICROCIRCUITS; THERMOCOMPRESS BONDING  
02  
Section Class Codes: B2540  
Unified Class Codes: SNEAAB

869003 87610046  
A THICK FILM ELECTRONIC HYBRID COIL'  
JACKSON, L.N.  
ROYAL MELBOURNE INST. OF TECHNOLOGY, MELBOURNE, VICTORIA,  
AUSTRALIA  
PHOT. INST. RADIO AND ELECTRON. ENG. AUST. (AUSTRALIA)  
VOL.16, NO.5 117-18 MAY 1975 Code: PR4AUG  
A CIRCUIT IS DESCRIBED WHICH CAN REPLACE THE CONVENTIONAL  
HYBRID COIL AS A TWO WIRE/FOUR WIRE CONVERTER IN COMMUNICATION  
CIRCUITS. THE CIRCUIT HAS BEEN REALISED AS A THICK FILM  
MICROCIRCUIT (2 res.)  
Descriptors: TELEPHONE STATION EQUIPMENT; CONVERTORS; THICK  
FILM CIRCUITS  
Identifiers: ELECTRONIC HYBRID COIL; TWO WIRE/FOUR WIRE  
CONVERTOR; THICK FILM MICROCHIP  
02  
Section Class Codes: B3532, B2522  
Unified Class Codes: FECCAY, SMCCAX

869004 87609560  
CERAMIC SUBSTRATES LASER MACHINED' A VITAL PRODUCT  
NOELLES, J.  
ELECTRON. AND MICROELECTRON. IND. (FRANCE) NO.209 39-43  
1 OCT. 1975  
Code: ENCIAS  
Discusses production laser beam machining of ceramic  
substrates for hybrid microcircuits. Several examples are  
given  
Descriptors: INTEGRATED CIRCUIT PRODUCTION; HYBRID



868133 A7613958, B7609991

OXIDATION OF TITANIUM THIN FILMS

SYLWESTROWICZ, W.D. FAIRFIELD DICKINSON UNIV., MADISON, NJ, USA

J. ELECTROCHEM. SOC. (USA) VOL.122, NO.11

1975 CODEN: JEDAN

TITANIUM THIN FILMS EXPOSED TO AN OXIDISING ARGON ATMOSPHERE IN THE TEMPERATURE RANGE FROM 30 DEGREES TO 400 DEGREES. IN SPECIMENS EXPOSED TO THE TEMPERATURE ABOVE 300 DEGREES TWO STAGES WERE OBSERVED. INITIALLY, RESISTANCE INCREASED LINEARLY WITH TIME AND TEMPERATURE. COEFFICIENT VALUES WERE POSITIVE. AFTER PROLONGED EXPOSURE RESISTANCE INCREASED EXPONENTIALLY WITH TIME, AND NEGATIVE TEMPERATURE COEFFICIENTS WERE OBSERVED. IT IS SUGGESTED THAT THIS BEHAVIOR RESULTS FROM A PROGRESSIVE OXIDATION AT GRAIN BOUNDARIES, WHEN OXIDATION IS COMPLETE THROUGH GRAIN BOUNDARIES TO THE SUBSTRATE, CONDUCTION IS THEN DEPENDENT ON A TUNNELING PROCESS THROUGH THE SEMICONDUCTING TITANIUM OXIDE, LEADING TO THE OBSERVED EXPONENTIAL TEMPERATURE AND TIME OF EXPOSURE DEPENDENCE (6 Refs.)

Descriptors: METALLIC THIN FILMS; TITANIUM; OXIDATION; THIN FILM CIRCUITS  
Identifiers: RESISTANCE; GRAIN BOUNDARIES; TUNNELING PROCESS; 30 TO 400 DEGREES C; Ti FILMS; OXIDATION

02

Section Class Codes: A7864, B2524

Unified Class Codes: NVREJ, SMCEAH

868130 B7609988

SCREENS: ESSENTIAL TOOLS FOR THICK FILM PRINTING

FRANCONVILLE, F. HONEYWELL-BULL, SAINT-OMER, FRANCE

ELECTRON. AND MICROELECTRON. IND. (FRANCE)

NO.209

44-9

1 OCT. 1975 Coden: ENCLAS  
DISCUSSES SOME OF THE MAIN PARAMETERS OF SCREENS WHICH ARE USED IN THICK FILM TECHNOLOGY, FOR ACHIEVING HIGH DENSITY AND PRECISE FINE LINE PRINTING FOR MULTI-LAYER CIRCUITS. MATERIAL USED, SELECTION, CONTROL AND EVOLUTION OF THE SCREEN PARAMETERS ARE PRESENTED, VERSUS, THEIR EFFECT ON THE QUALITY TO BE OBTAINED AND PRESERVED IN PRODUCING THESE CIRCUITS. AFTER AN EXPERIMENT OF MANUFACTURING AND USING MASKS, SCREENS WITH MESH COATED BY EMULSION STENCIL WERE SELECTED AS THE MAIN TOOL FOR THE APPLICATIONS DESCRIBED.

Descriptors: THICK FILM CIRCUITS; PRINTED CIRCUITS; PRINTING; INTEGRATED CIRCUIT PRODUCTION  
Identifiers: THICK FILM PRINTING; PRECISE FINE LINE PRINTING; SCREEN PRINTING; SCREENS; SCREEN MESH MATERIALS; HIGH DENSITY PRINTING; MULTILAYER CIRCUITS; COATED MESH SCREENS

02

Section Class Codes: B2524, B1263

Unified Class Codes: SMCEAH, ADMAE

B76129 B760987

THICK FILM CONVEYOR FURNACES-CURRENT STATUS

ANIES, A. ROSTEK CORP., CARROLLTON, TX, USA

SOLID STATE TECHNO. (USA) VOL.18, NO.11

12 NOV. 1975

Codon: SSTEAP

Descriptors: THICK FILM CIRCUITS; INTEGRATED CIRCUIT PRODUCTION; ELECTRIC FURNACES  
Identifiers: THICK FILM FURNACES; FIRING

02

Section Class Codes: B2522, B5820, B5642

Unified Class Codes: SMCCAX, TMEAAQ, TMKCAQ

Descriptors: THICK FILM CIRCUITS; DISPLAY SYSTEMS; DIPPING MATERIALS; CHIP CARRIERS; PLAIN-PI- SILVIAH AND NICHELI; LASER STABLE INKS; FOR COMMERCIAL APPLICATIONS SUCH AS AUTOMOTIVE, COMMUNICATIONS OR THERMAL PRINTERS  
Identifiers: CAVITY PRINTING MATERIALS; CHIP CARRIERS; DIPPING MATERIALS; END TERMINATIONS; LASER STABLE INKS; THICK FILM CIRCUITS; NEW MATERIALS DEVELOPMENTS; LOW COST CONDUCTORS; PLASMA DISPLAYS

02

Section Class Codes: B2524, B2898, B2859

Unified Class Codes: SMCEAH, SMAC, SCIAAS

868128 B7608986  
**THICK-FILM TECHNOLOGY**  
 FUNK, W.  
 PHILIPS, FORSCHUNGSLAB. HAMBURG GMBH, HAMBURG, GERMANY  
 1975 Coden: PRAN  
 PHILIPS TECH. REV. (NETHERLANDS) VOL.35, NO.5 144-50  
 DISCUSSES MANUFACTURE OF HYBRID CIRCUITS BY THE THICK FILM TECHNOLOGY WHICH IS A MODIFICATION OF THE SCREEN-PRINTING PROCESS, COUPLED WITH A CERAMIC FIRING PROCESS. THE METHOD MEETS THE REQUIREMENTS PLACED ON THE INTERCONNECTIONS IN FAST DIGITAL HYBRID CIRCUITS. WITH A GENERAL DESCRIPTION OF THE PROCESS, THE PROBLEMS ASSOCIATED WITH APPLICATION TO MASS PRODUCTION ARE DISCUSSED. THE MOST SUCCESS HAS BEEN OBTAINED WITH CERAMIC AL/SUB 2/O/SUB 3/ SUBSTRATES (99PERCENT PURITY), GLASS-FRIT PASTES FIRED AT 950-1000 DEGREES, AND SPECIALLY DEVELOPED SCREENS. THE MANY INDICATIONS POINTING TO A RAPID GROWTH IN THE USE OF THE METHOD ARE SUMMARIZED (4 Refs)  
 Descriptors: HYBRID INTEGRATED CIRCUITS; DIGITAL INTEGRATED CIRCUITS; THICK FILM CIRCUITS; INTEGRATED CIRCUIT PRODUCTION; SUBSTRATES  
 Identifiers: THICK FILM TECHNOLOGY; CERAMIC FIRING PROCESS; DIGITAL HYBRID CIRCUITS; CERAMIC AL/SUB 2/O/SUB 3/ SUBSTRATES; GLASS FRIT PASTES; SCREEN PRINTING; INTEGRATED CIRCUIT PRODUCTION  
 02 Section Class Codes: B2522, B2540  
 Unified Class Codes: SMCCAX, SMEAAB

868129 B7608985  
**THE EFFECT OF THE TRIMMING TECHNIQUE FOR TOP HAT TYPE RESISTORS ON THE DESIGN PROCESS**  
 HAJDU, I.  
 B.I.E. ELEKTRONIKAI TECNOLOGIA TANZEK, BUDAPEST, HUNGARY  
 1975 Coden: FRKAY  
 FILOMECH. AND MIMROTECH. (HUNGARY) VOL.14, NO.9 275-7  
 SEPT. 1975  
 IN DESIGNING THE TOPOLOGY OF THICK FILM INTEGRATED CIRCUITS THE USE OF THE SO-CALLED TOP HAT TYPE RESISTORS CAN BE VALUABLE ON ACCOUNT OF THE GREAT DEGREE OF POSSIBLE VALUE ADJUSTMENT. THE TRIMMING METHOD HAS A TIGHT CONNECTION OF CERTAIN ASPECTS OF THE DESIGN (5 Refs)  
 Descriptors: THICK FILM RESISTORS; THICK FILM CIRCUITS  
 Identifiers: TRIMMING TECHNIQUE; TOP HAT TYPE RESISTORS; THICK FILM INTEGRATED CIRCUITS; TOPOLOGY DESIGN; THICK FILM RESISTORS  
 02 Section Class Codes: B2522, B2540, B2210  
 Unified Class Codes: SMCCAX, SMEAAB, SEEAS  
 Language: HUNGARIAN

868129 B7608982  
**SYSTEM CONSIDERATIONS OF THICK FILMS**  
 MORNAN, P.L.  
 LOUGHBOROUGH UNIV., LOUGHBOROUGH, ENGLAND  
 ELECTRON. IND. (GB) VOL.1, NO.4 19-21 DEC. 1975  
 Coden: EIN009  
 DISCUSSES THE PROPERTIES OF ALUMINA AND THE COMPROMISES REQUIRED IN THE DESIGN OF ACTIVE FILTERS (21 Refs)  
 Descriptors: THICK FILM CIRCUITS; ACTIVE FILTERS; SUBSTRATES; SYSTEM CONSIDERATIONS; ALUMINA; ACTIVE FILTERS; DESIGN COMPROMISES; THICK FILM CIRCUITS; PROPERTIES OF ALUMINA  
 02 Section Class Codes: B2522, B1880  
 Unified Class Codes: SMCCAX, ETRAAM

868125 B7608982  
**THICK-FILM RESISTOR NETWORKS REDUCE DIGITAL SYSTEM COSTS**  
 LOUDON, R.  
 ELINCL ELECTRON. (GB) NO.84 21-2, 25 6 NOV. 1975 Coden:  
 RESISTORS CAN BE A SIGNIFICANT COST ELEMENT IN A TYPICAL DIGITAL SYSTEM. AVAILABLE BOARDSPACE, HANDLING TIME AND ASSEMBLY TIME ARE MAJOR COST FACTORS. THE INCORPORATION OF RESISTORS IN A PREPACKAGED NETWORK CAN SIGNIFICANTLY REDUCE A SYSTEM COST  
 Descriptors: DIGITAL CIRCUITS; THICK FILM RESISTORS; PACKAGING; ECONOMICS; THICK FILM CIRCUITS; COST FACTORS; PREPACKAGED NETWORK; THICK FILM RESISTOR NETWORKS  
 02 Section Class Codes: B2522, B2210, B1266, B1870  
 Unified Class Codes: SMCCAX, SEEAS, ADGHAH, ETNAAP

868123 B7608980  
**A NEWLY DEVELOPED MULTILAYER INTERCONNECTION TECHNIQUE**  
 KOCIS, A.  
 APPL. SCI. DIV., SHERBROOKE UNIV., QUEBEC, CANADA  
 ELECTRON. AND MICROELECTRON. IND. (FRANCE) NO.209 62-3  
 1 OCT. 1975 Coden: FMC1AS  
 DESCRIBES A NOVEL METHOD TO PRODUCE PRACTICAL INTERCONNECTION FOR MULTILAYER STRUCTURES DOWN TO 3 MIL DIAMETER WITH VERY HIGH YIELD (99PERCENT). PREVIOUSLY IMPOSSIBLE TO OBTAIN WITH CONVENTIONAL THICK FILM SCREENING TECHNIQUES  
 Descriptors: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; PRINTED CIRCUITS; INTEGRATED CIRCUIT PRODUCTION  
 Identifiers: MULTILAYER INTERCONNECTION TECHNIQUE; NOVEL METHOD; 3 MIL DIAMETER; HIGH YIELD; THICK FILM SCREENING  
 TECHNIQUES; 99PERCENT YIELD; THICK FILM CIRCUITS; HYBRID ICs;  
 HIGH LINE DENSITIES  
 02 Section Class Codes: B2522, B2540  
 Unified Class Codes: SMCCAX, SMEAAB

868126 B7608983  
**SOME SYSTEM CONSIDERATIONS OF THICK FILMS**

867714 B7608502  
 TRIMMING TO "TENTHS" TAKES TECHNIQUE (THICK-FILM RESISTOR TRIMMING FOR MICROMINATURE CIRCUITS)  
 FISCHER, J.  
 MICROELECTRONICS (GB)  
 MICELIN  
 VOL.5, NO.2 57-8 1973 Coden:  
 THICK-FILM RESISTOR TRIMMING TECHNIQUES ARE NOW REASONABLY WELL ESTABLISHED AND NO LONGER POSE ANY GREAT PRODUCTION DIFFICULTIES. WITH THE LARGE RESISTORS FOUND IN CONVENTIONAL HYBRID CIRCUITS, HOWEVER, IN MICROMINATURE CIRCUITS, TRIMMING EACH RESISTOR CAN BE QUITE AN ART. THE AUTHOR DESCRIBES AN ABRASIVE JET TRIMMING TECHNIQUE WHICH CAN BE USED EFFICIENTLY TO TRIM ANY JETIFICATION

Descriptors: THICK FILM RESISTORS; THICK FILM CIRCUITS; RESISTOR TRIMMING; MICROMINATURE CIRCUITS; HYBRID ICS

Identifiers: ABRASIVE JET TRIMMING TECHNIQUE; THICK FILM RESISTORS; HYBRID ICS

02 Section Class Codes: B2210, B2522  
 Unified Class Codes: SEEAS, SMCCAX

867512 B7608305  
 1 MHZ TO 1.5 GHZ THIN-FILM AMPLIFIER FEATURES THREE STAGES IN A TO-3 CAN  
 HIBBS, G.  
 AVANTUM INC., SANTA CLARA, CA, USA  
 MICROWAVE SYSTEMS (USA) VOL.5, NO.3 46-7 JUNE-JULY 1971, Coden: MWS1A9  
 By EXTENDING THE CONCEPT OF THIN-FILM WIDEBAND AMPLIFIERS TO INCLUDE MULTIPLE STAGES, THIS NEW UNIT OFFERS GAIN, PERFORMANCE AND COST BENEFITS.

Descriptors: MICROWAVE AMPLIFIERS; WIDEBAND AMPLIFIERS; SOLID-STATE MICROWAVE CIRCUITS; THIN FILM CIRCUITS GHZ; THREE STAGES; WIDEBAND; SINGLE SUBSTRATE; COMPUTER AIDED DESIGN

02 Section Class Codes: B1B40, B1B20, B2524  
 Unified Class Codes: ETHANB, ETEAAD, SMCEAH

860135 B7604321, C7605003  
 A 10-BIT DIGITAL-ANALOGUE CONVERTOR  
 LOJEK, B.  
 SILEVACI TECH. (CZECHOSLOVAKIA) VOL.23, NO.9 325-6  
 SEPT, 1975 Coden: SDTEAM  
 DESCRIBES A 10-BIT CONVERTOR EMPLOYING AN ACCURATE R-2R CIRCUIT; A SWITCH WITH A SMALL INTERNAL RESISTANCE AND LOW VOLTAGE OFFSET WHICH EMPLOYS THREE TRANSISTORS; AND AN OPERATIONAL OUTPUT AMPLIFIER. USING A THIN FILM RESISTOR CIRCUIT, HIGHER SPEED AND MORE FAVOURABLE THERMAL BEHAVIOUR

24 E. 47TH ST., NEW YORK, NY 10017 212-587-4444

RESISTORS; THIN FILM CIRCUITS; OPERATIONAL AMPLIFIERS  
 Identifiers: THIN FILM RESISTOR CIRCUIT; SPEED: THERMAL BEHAVIOUR; DIGITAL ANALOGUE CONVERSION; OPERATIONAL AMPLIFIER 02  
 Section Class Codes: B1B90, C9960, B2210, B2524  
 Unified Class Codes: ETAAAC, XTKAS, SEEAS, SMCEAH  
 Language: CZECH

856222 B7605157  
 PRODUCTION EXPERIENCES OF THIN FILM HYBRID CIRCUITS FOR SERIES OF MOBILE TELEPHONE CHANNELS IN N2 TECHNIQUE  
 MOSCA, E.; CANALE, G.P.  
 MARCONI ITALIANA, GENOVA, ITALY  
 ALTA FREQ. (ITALY) VOL.4, NO.9 524-35 SEPT, 1975  
 Coden: ALFRAJ  
 DIFFICULTIES ENCOUNTERED IN THE MANUFACTURE OF LARGE SCALE (8000 CHANNEL, 72000 MICROCIRCUIT, 40000 RESISTIVE NETWORKS) THIN FILM CIRCUITS ARE DESCRIBED. PRODUCTION PROCESS IS DETAILED, INCLUDING COMPONENT DETAILS, PRODUCTION PROGRAMMES, TOLERANCES, ASSEMBLY ETC. UNDERLINING SPECIAL DIFFICULTIES ENCOUNTERED AND BREAK DOWNS. SECOND PART DEALS WITH OPERATIONAL EXPERIENCES. DURING FIRST 1000 HOURS OF SERVICE COMPARING THE PERFORMANCE WITH CONVENTIONAL COMMUNICATION CIRCUITS, NEED FOR DESIGN STANDARDIZATION AND PROCESS AUTOMATION IS UNDERLINED IN CONCLUSION

Descriptors: HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS; INTEGRATED CIRCUIT PRODUCTION; TELEPHONE EQUIPMENT  
 Identifiers: THIN FILM HYBRID CIRCUITS; CHANNELS IN N2 TECHNIQUE; PRODUCTION EXPERIENCE 02  
 Section Class Codes: B3550, B2540, B2524  
 Unified Class Codes: FEGAAC, SMEAB, SMCEAH  
 Language: ITALIAN

855133 A7610439, B7604738  
AN EVAPORATOR FACILITY FOR DEPOSITION OF MULTIELEMENT THIN FILM PATTERNS

MERAY, L.H.  
RCA LABS., PRINCETON, NJ, USA

J. VAC. SCI. AND TECHNOL. (USA)  
21ST NATIONAL SYMPOSIUM OF THE AMERICAN VACUUM SOCIETY

8-11 OCT. 1974 ANAHEIM, CALIF. USA  
INCLUDES A MASK CHANGER AND EVAPORATOR, A FACILITY WHICH

FABRICATING THIN FILM CIRCUITS, A FACILITY WHICH WHICH  
DESCRIBED. MECHANICAL PROBLEMS INVOLVED IN ITS USE ARE

DESCRIBED: PRODUCTION: THIN FILM CIRCUITS: VAPOUR DEPOSITION

IDENTIFIERS: DEPOSITION OF MULTIELEMENT THIN FILM PATTERNS  
MASK CHANGER: EVAPORATOR: THIN FILM CIRCUITS: MECHANICAL

PROBLEMS

06

Section Class Codes: B2524, A9112, A0634

Unified Class Codes: SMCEAH, 26CCAK, BGGEAR

055132 STUDIES ON THE Al/Si/20/5SUB 3/Ti-Mo-Au METALLIZATION

SHIMA, R.  
CALIFORNIA INST. TECHNOL., PASADENA, USA

J. VAC. SCI. AND TECHNOL. (USA)  
21ST NATIONAL SYMPOSIUM OF THE AMERICAN VACUUM SOCIETY

8-11 OCT. 1974 ANAHEIM, CALIF. USA  
BACKSCATTERING SPECTROMETRY FOR SAMPLE PREPARATION AND

METALLIZATION. STRUCTURE ANALYSIS OF MULTILAYER COUPLES Mo-Au AND Ti-Mo ARE DESCRIBED. RESULTS OF MULTILAYER

Ti-Mo-Au TRIPLE LAYER. SIMILAR RESULTS ARE DISCUSSED FOR THE  
ALSO CONSIDERED. IT IS SHOWN THAT Mo-Au CARBON SUBSTRATE IS

DEPOSITION AND THAT AT 600 DEGREES, 1000 AA OF Mo DOES NOT  
THROUGH Ti-Mo MIXING ALTHOUGH O/SUB 2/1 INHIBITS MOTION OF Ti

CIRCUITATORS: METALLISATION: THIN FILM CIRCUITS: INTEGRATED

ANALYSIS: Mo-Au; Ti-Mo; Ti-Mo-Au TRIPLE LAYER: Al/Si/20/5SUB

3/Ti-Mo-Au METALLIZATION SYSTEM: MULTILAYER STRUCTURES:  
C SUBSTRATE: C-MIXING: DIFFUSION: PRESENCE

Unified Class Codes: SMCEAH

855431 B7604736  
COST EFFICIENCY OF THICK-FILM CONDUCTORS

RIEMER, D.E.  
BOEING MICROELECTRONICS, SEATTLE, WA, USA

1975 COUN: SSTEAP VOL.18, NO.10 42-5 OCT.

COST CONSIDERATIONS IN THE SELECTION OF THICK FILM MATERIALS  
ARE DISCUSSED. COST PERFORMANCE FACTORS ARE DEFINED THAT

PERMIT THE COMPARISON OF THE COSTS OF THE MATERIALS. THE COSTS OF THICK FILM OR THICK-FILM CONDUCTORS ARE DEFINED THAT

TO CHARACTERISE CONDUCTOR INKS. DEPOSITION WEIGHT IS USED  
DESCRIPTORS: (2 PERS)

IDENTIFIERS: THICK FILM CIRCUITS

CONDUCTOR THICK FILM

HYBRID CIRCUITS: THICK FILM MATERIALS: COST EFFICIENCY:

02

Section Class Codes: B2522

Unified Class Codes: SMCCAK

855430 B7604735

MEASUREMENT OF THE SOLDERABILITY OF THICK-FILM CIRCUITS  
PANTANELLI, G.P.  
BELL TELEPHONE LABS, INC., ALLENTOWN, PA, USA

1975 COUN: SSTEAP VOL.18, NO.10 39-41 OCT.

RESULTS OF SOLDER WETTING, AS MEASURED BY A SURFACE TENSION  
WEPTED BY SOLDER AND TO VISUAL APPEARANCE OF A SPECIMEN

RELATIVE STRENGTH ON A LEAD SOLDERED  
OF THE SOLDER JOINT IS ALSO INVESTIGATED. THE BOND HOLDING STRENGTH

TERM RELIABILITY OF LEADS SOLDERED TO SEVERAL THICK FILM  
1.05N-97.5PD-1.5AG (4 ROTS)

DESCRIPTORS: THICK FILM CIRCUITS: SOLDERING; RELIABILITY  
TESTS: SOLDER WETTING: SURFACE TENSION APPARATUS: VISUAL

STRENGTH: RELIABILITY: SOLDER PADS

02

Section Class Codes: B2522

Unified Class Codes: B1263

855427 B7604732 SCREEN PRINTING STENCILS FOR THICK FILM CIRCUITS

FREUDENHEIM, H. MICROASK LTD., LONDON, ENGLAND

ELECTRON. PROD. METHODS AND EQUIP. (GB)

SEPT, 1975. Code: E1014 VOL. 4, NO. 7 37-9

OUTLINE: SEVERAL FACTORS WHICH INFLUENCE THE QUALITY OF THICK FILM CIRCUITS AND DESCRIBES IN DETAIL TWO SCREEN PRINTING STENCILS WHICH MEET THE SPECIAL REQUIREMENTS OF THE MICRO ELECTRONICS INDUSTRY. 'DURAMET' IS A POLYMER STENCIL WHICH IS COMPLIANT TO ENGRAVED FEATURES ON THICK FILM SUBSTRATES. 'DURAMISK' IS A METAL MASK WHICH HAS BEEN METALLURGICALLY BONDED TO A WIRE CLOTH. TO COMBINE ITS STABILITY WITH MAXIMUM ELASTICITY, DURAMET IS NORMALLY WELDED TO AN OUTER POLYMER MESH. DURAMET IS PRODUCTION: MASKS; THICK FILM CIRCUITS; INTEGRATED CIRCUIT

Identifiers: SCREEN PRINTING STENCILS; POLYMER STENCIL; METAL MASK; THICK FILM CIRCUITS PRODUCTION; INTEGRATED CIRCUIT

02

Section Class Codes: B2522

Unified Class Codes: SMCCAX

Language: GERMAN

ACTIVE RC FILTERS IN THE HYBRID THIN TANTALUM FILM TECHNIQUE

BOSELMANN, W. SIEMENS AG, MUNICH, GERMANY

ELEKTRON. INT. (AUSTRIA)

NO. 9 313-16 1975 Code: EK149

THE GENERAL MATHEMATICAL FORMULAE FOR ACTIVE HIGH-PASS AND LOW-PASS FILTERS USING R-C NETWORKS ARE GIVEN BUT NOT DESIGN METHODS. WITH A SINGLE OPERATIONAL AMPLIFIER AND A QUALITY FACTOR  $Q_{SUB} < 10$ , THE COMPONENT TOLERANCES ARE NOT CLOSE. TANTALUM FILMS SPUTTERED ON A CERAMIC SUBSTRATE ARE USEFUL FOR CONSTRUCTION OF THE PASSIVE ELEMENTS OF HYBRID CIRCUITS. OXIDATION OF THE TA TO THE TANTOXIDE PROVIDES A CAPACITOR DIELECTRIC. (5 Revs) Designators: ACTIVE FILTERS; HYBRID INTEGRATED CIRCUITS;

Identifiers: OPERATIONAL AMPLIFIER; QUALITY FACTOR; PASS FILTERS; HIGH PASS FILTER; HYBRID THIN TA FILM; HYBRID INTEGRATED CIRCUITS; TA OXIDATION

Section Class Codes: B1680, B2540, B2524

Unified Class Codes: E7RAAM, SMCAAB, SMCEAB

Language: GERMAN

855426 A7604007, B7604731

TECHNIQUE AND APPLICATIONS OF AUGER ELECTRON SPECTROSCOPY

PALBERG, P.W. PHYS. ELECTRONICS INDUSTRIES INC., EDEN PRAIRIE, MN, USA

ELECTROCHEMICAL SOCIETY

11-16 MAY 1975 TORONTO, CANADA

1975 ELECTROCHEMICAL SOCIETY SPRING MEETING. (EXTENDED ABSTRACTS)

THE SENSITIVITY OF ELEMENT DETECTION IN AUGER ELECTRON SPECTROSCOPY IS DISCUSSED. IT IS SHOWN THAT THE IN DEPTH DISTRIBUTION OF ELEMENTS IN THIN FILM STRUCTURES CAN BE OBTAINED BY COMBINING THE METHOD WITH INERT GAS SPUTTER ETCHING. APPLICATIONS TO INTERFACIAL CHEMISTRY, EXPLORATION IN THIN FILM STRUCTURES ON MICROCIRCUITS, AND TWO DIMENSIONAL IMPURITY DISTRIBUTIONS AT GRAIN BOUNDARIES ARE MENTIONED. Designators: THIN FILM CIRCUITS; AUGER EFFECT; ELECTRON SPECTROSCOPY

Identifiers: AUGER ELECTRON SPECTROSCOPY; ELEMENT DETECTION; INERT GAS SPUTTER ETCHING; INTERFACIAL CHEMISTRY; THIN FILM STRUCTURES; MICROCIRCUITS; IMPURITY DISTRIBUTIONS; TRACE ELEMENT ANALYSIS

06

Section Class Codes: B2520, A0695

Unified Class Codes: SMCAAL, B0ZMZZ



B43718 B7601030 TANTALUM NITRIDE THIN FILM CIRCUITS ON POLYIMIDE TERADA, T.; USHIGOME, M.; TAMAKI, S. NIPPON ELECTRIC CO., SEMICONDUCTOR DIV., NAKAHARA-KU, KAWASAKI CITY, JAPAN ELECTROCHEMICAL SOC. ELECTROCHEMICAL SOC. SPRING MEETING. (EXTENDED ABSTRACTS) 11-16 MAY 1975 TORONTO, CANADA. ELECTRUMINIUM NITRIDE THIN FILM CIRCUITS, SPUTTERED ON POLYIMIDE HAVE BEEN STUDIED. WHEN SPUTTERED AT 150 DEGREESC, THE AUTHORS HAVE FOUND THE BETTER FILM FOR WHICH THE TEMPERATURE COEFFICIENT OF RESISTANCE HAS BEEN FROM -60 TO +20 PPM/ DEGREEC. AT THE TEMPERATURE RANGE OF 25 DEGREESC TO 125 DEGREEC AND THE CHANGE OF THE RESISTANCE HAS BEEN +1,0 PERCENT A 120 DEGREEC FOR 3600 HOURS. SOME PROBLEMS IN THE PRODUCTION OF STABLE THIN FILMS ARE DISCUSSED. Identifiers: SPUTTERING; THIN FILM CIRCUITS; POLYIMIDE; SPUTTERING 06 Section Class Codes: B2522 Unified Class Codes: SMCEAH

B43719 B7601030 SCREENPRINTING: INTEGRATED CIRCUIT PRODUCTION Descriptors: PHOTOLITHOGRAPHY; INTEGRATED CIRCUIT PRODUCTION; THICK FILM CIRCUITS Identifiers: SCREENPRINTING; SCREEN POSITIONING; SQUEEZE BLADE; PRESSURE; METALLIC SOLUTIONS; METALLIC PARTICLE SUSPENSION; INTEGRATED CIRCUIT PRODUCTION; PHOTOLITHOGRAPHY 02 Section Class Codes: B2522 Unified Class Codes: SMCCAX

B43720 B7600566 THIN FILM NETWORKS IN FREQUENCY AND TIME DOMAIN Descriptors: HYBRID CONSTRUCTION; THIN FILM NETWORKS Identifiers: ACTIVE FILTERS; THIN FILM CIRCUITS; ACTIVE RC STRUCTURES; HYBRID CONSTRUCTION; THIN FILM NETWORK; FREQUENCY DOMAIN; TIME DOMAIN 02 Section Class Codes: B1880, B2524 Unified Class Codes: ETRAAM, SMCEAH Language: GERMAN

B43715 B7601028 TEMPERATURE MEASURING DEVICE FOR THICK-FILM IC'S NIKONOWSKI, A.; JACKOWSKI, J. ELEKTRONIKA (POLAND) CODEN: EUNRZ THE PAPER DEALS WITH MEASUREMENT PROBLEMS OF TEMPERATURE DISTRIBUTION IN INTEGRATED CIRCUITY. SPECIAL ATTENTION IS PAID TO DETECTION OF INTEGRATED RADIATION. A MEASUREMENT DEVICE FOR THICK-FILM IC INVESTIGATION IS DESCRIBED (15 refs). Descriptors: THICK FILM CIRCUITS; TEMPERATURE MEASUREMENT Identifiers: TEMPERATURE MEASURING DEVICE; THICK FILM IC'S; INTEGRATED CIRCUITS; INFRARED RADIATION DETECTION 02 Section Class Codes: B2522, B4147, B4240 Unified Class Codes: SMCCAX, BKEAA, BECKAP Language: POLISH

B43715 B7601027 SCREENPRINTING THICK-FILM BIELER, J. CIRCUITS MANUF. (USA) CODEN: CMGAF DISCUSSES COMMON PROBLEMS ENCOUNTERED IN SCREENPRINTING, E.G. SCREEN FATIGUE, EFFECTS OF HANDLING DURING CLEANING, SCREEN POSITIONING, SETTING SQUEEZE BLADE PRESSURE ETC, SUGGESTS THAT IMPROVEMENTS IN INKS PLAY AN IMPORTANT ROLE IN THICK-FILM PRINTING ADVANCES AND FORECASTS THE DEVELOPMENT OF METALLIC SOLUTIONS AS POTENTIAL SUCCESSORS OF THE METALLIC 02 Section Class Codes: B2522, B4147, B4240 Unified Class Codes: SMCCAX, BKEAA, BECKAP Language: POLISH

835885 B7541809, C752B995  
MANUFACTURE OF MAGNETIC HEAD  
Patent No.: UK 1395017 Assignees: IBM CORP Filed: 1  
DEC. 1972 Original Patent Appl. No.: US 211554  
Priority Date: 23 DEC 1971  
21 MAY 1975  
A. MAGNETIC UNDERLAYER IS DEPOSITED ON A NON-MAGNETIC SUBSTRATE, AND ON IT TWO, LATERALLY SPACED ELECTRICALLY CONDUCTIVE WINDINGS ARE DEPOSITED, AND OVER THESE A MAGNETIC OVERLAYER IS SEACED FROM THE UNDERLAYER EXCEPT AT ITS ENDS, TO FORM A CLOSED MAGNETIC PATH LINING THE TWO WINDINGS TO FORM A TRANSFORMER. THE ELECTRICAL PROPERTIES OF THE TRANSFORMER ARE THEN TESTED, AND IT IS THEN SEVERED BETWEEN THE TWO WINDINGS, SO THAT THE SEVERED PART INCLUDING THE FIRST WINDING FORMS THE MAGNETIC HEAD. THE TRANSFORMER IS TESTED BY APPLYING A CURRENT TO ONE WINDING AND MEASURING THE INDUCED CURRENT IN THE OTHER. Describers: MAGNETIC HEADS; TRANSFORMER TESTING; TRANSFORMER WINDINGS; THIN FILM CIRCUITS  
Identifiers: MAGNETIC HEAD; MAGNETIC UNDERLAYER; CONDUCTIVE WINDINGS; MAGNETIC OVERLAYER; THIN FILM TRANSFORMER  
011 Section Class Codes: B2760, B2220, C9680  
Unified Class Codes: 510A, SEKAAL, XMRAA

011 Section Class Codes: B2760, B2220, C9680  
Unified Class Codes: 510A, SEKAAL, XMRAA

835381 B7541725, C752B351  
MICROCIRCUIT THERMAL DESIGN TABLES AND COMPUTER PROGRAM FOR TWO-DIMENSIONAL LAYOUTS  
HARBLING, P. G.; DEAN, D. J.  
METALL, DIV. AWE, ALDERMASTON, ENGLAND  
I.E.E., INTERNAT. SOC. HYBRID MICROELECTRONICS, I.E.E. INST.  
PHYS., I.E.E.  
ISBN 0 903748 25 B  
CONFERENCE ON HYBRID MICROELECTRONICS 1974-204 1975  
9-11 SEPT. 1975, LOUGHBOROUGH, LEICS., ENGLAND  
I.E.E. LONDON, ENGLAND  
TWO THERMAL DESIGN AIDS ARE DESCRIBED FOR THE EVALUATION OF TEMPERATURE DISTRIBUTIONS ON HYBRID MICRO CIRCUITS. THE FIRST IS A COMPUTER PROGRAM EMPLOYING A SIMPLE CO-ORDINATE SYSTEM, IN WHICH THE FOLLOWING VARIABLES ARE ENTERED AS DATA: SUBSTRATE DIMENSIONS AND THERMAL CONDUCTIVITY; POSITIONS OF HEAT SINKING EDGES; HEAT TRANSFER COEFFICIENT FOR CONVECTION COOLING, AND POWER SOURCE STRENGTHS AND LOCATIONS. THIS PROGRAM HAS BEEN USED TO PRODUCE THERMAL DESIGN TABLES WHICH EMPLOY THE SUPERPOSITION THEORY AS PROPOSED AT THE 1973 CANTERBURY CONFERENCE. THESE TABLES ALLOW RAPID DETERMINATION OF SUBSTRATE TEMPERATURES WITHOUT RECALLING TO A COMPUTER THE LAYOUT OF THE TABLES. THE DETAILS OF THEIR USE ARE EXPLAINED. POSSIBLE FUTURE APPLICATIONS OF DESIGN TABLES ARE ALSO DISCUSSED. (5 Refs.)  
Describers: HYBRID INTEGRATED CIRCUITS; COMPUTER-AIDED DESIGN; ELECTRONICS APPLICATIONS OF COMPUTERS

Identifiers: TEMPERATURE DISTRIBUTIONS; HYBRID MICRO CIRCUITS ; COMPUTER PROGRAM; SUBSTRATE TEMPERATURES; MICROCIRCUIT THERMAL DESIGN TABLES; TWO DIMENSIONAL LAYOUTS  
06 Section Class Codes: B2540, C9642  
Unified Class Codes: SMEAAB, WMEAQ

83541 B7541655, C752B678  
A TECHNOLOGY FOR HIGH SPEED COMPUTER SYSTEMS  
MILDEN, S.; MINIMENT, D. J.; MARION, N. V.  
PLESSEY CO. LTD., ALLEN CLARK RES. CENTRE, CASWELL, ENGLAND  
I.E.E., INTERNAT. SOC. HYBRID MICROELECTRONICS, I.E.E. INST.  
PHYS., I.E.E.  
ISBN 0 903748 25 B  
CONFERENCE ON HYBRID MICROELECTRONICS 1974-57 1975  
9-11 SEPT. 1975, LOUGHBOROUGH, LEICS., ENGLAND

THIS PAPER DESCRIBES A TECHNOLOGY DEVELOPED TO REDUCE THE AVERAGE INTERCONNECTION DELAY IN LARGE HIGH SPEED COMPUTER SYSTEMS. MULTILAYER THICK FILM CIRCUITS ARE USED TO ACHIEVE A SUBSTANTIAL PACKING DENSITY INTEGRATION OVER EXISTING SYSTEMS. THE TYPICAL INTERCONNECTION LENGTH OBTAINED IS 1 CM AND THE DELAY DUE TO THIS IS OF THE ORDER OF 0.15 NSECS. POWER DISSIPATIONS OF UP TO 20 WATTS MAY BE DISSIPATED BY UP TO 24 CHIP'S ON A SINGLE 2.5 CM<sup>2</sup> CM CERAMIC SUBSTRATE AND 54 SUCH SUBSTRATES FORM A SINGLE 'THREE DIMENSIONAL' MODULE. (11 Refs.)

Describers: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS ; COMPUTER ARCHITECTURE  
Identifiers: HIGH SPEED COMPUTER SYSTEMS; INTERCONNECTION DELAY; PACKING DENSITY; CERAMIC SUBSTRATE; MULTILAYER THICK FILM CIRCUITS; POWER DISSIPATION  
06 Section Class Codes: B2522, B2540, C9640  
Unified Class Codes: SMECA, SMEAB, XGGAN

B35325 87541708, C7528204  
LASER TRIMMING AUTOMATION FOR HYBRID CIRCUITS  
LIMANN, O.  
ELEKTRONIK (GERMANY) VOL.24, NO.9 89 SEPT. 1975  
Briefly describes Teradyne's computer-controlled W 233  
trimming-machine employing a laser to adjust resistance  
elements in thin and thick film circuits. The computer enables  
trimpot resistance values to be inferred in terms of  
frequency and thus speeds the adjustment of filters etc  
Description: HYBRID INTEGRATED CIRCUITS; LASER BEAM  
APPLICATIONS; ELECTRONICS APPLICATIONS OF COMPUTERS; THIN FILM  
CIRCUITS; THICK FILM CIRCUITS; THICK FILM CIRCUITS; LASER  
Trimpot: HYBRID CIRCUITS; THICK FILM CIRCUITS; TRIMMING MACHINE;  
BEAM; TRIMMING; RESISTOR TRIMMING; W233 TRIMMING MACHINE;  
AUTOMATED TRIMMING; THIN FILM CIRCUITS; FILTER ADJUSTMENT;  
FREQUENCY ADJUSTMENT  
02  
Section Class Codes: B2540, B2522, B2524, B2980, C0842  
Unified Class Codes: SMEAA, SMCCAX, SMEAAH, EGMAA, WNEAQ  
Language: GERMAN

02  
Section Class Codes: B2524, B1267, A9112, A0634  
Unified Class Codes: SMEAA, ADGKAT, ZGCAAX, BGGEAR  
Language: SLOVENE

B32159 A7502162, B7541666  
STRENGTH OF GOLD-PLATED COPPER LEADS ON THIN FILM CIRCUITS  
UNDER ACCELERATED AGING  
HALL, D.M.; PAQUES, M.T.; MENZEL, P.R.  
BELL LABS., ALLENTHON, PA, USA  
IEE TRANS. PARTS, HYBRIDS AND PACKAG. (USA) VOL. PHP-11,  
NO.3 202-5 Sept. 1975  
The strengths of thermocompression bonds made between thin film  
plated copper lead frames and gold metallized thin film  
circuits decrease in time when aged at 200-300 degrees in air  
or vacuum unless there is a diffusion barrier such as nickel  
between the copper and gold. After pulling bonds to  
destruction, failure modes and failed surfaces were  
characterized by scanning electron microscopy, auger  
spectroscopy, electron microscopy, stylus probe, and x-ray  
diffraction. Oxidation, bulk formation, Kirkendall effect,  
and diffusion phase formation were considered as possible  
mechanisms for the degradation (9 refs.)  
Description: STRENGTHS; THERMOCOMPRESSION BONDS; GOLD PLATED  
COPPER LEAD FRAMES; GOLD METALLIZED THIN FILM CIRCUITS;  
FAILURE MODES; FAILED SURFACES; ORDERED PHASE FORMATION;  
ACCELERATED AGING; MECHANISM OF FAILURES; EXTRAPOLATION TO  
LOWER FAILURES; 200 TO 300 DEGREES C AGING  
02  
Section Class Codes: B2524, B1267, A912B  
Unified Class Codes: SMEAA, ADGKAT, ZGCAAX

ZABKAR, T.; NAVINSEK, B.  
ELEKTROTEH. VESTN. (YUGOSLAVIA) VOL.41, NO.9-10 227-31  
SEPT.-OCT. 1974  
Code: ELVEA2  
Describes a DC sputtering device. Optimal working conditions  
for the diode system are determined and analysis of deposition  
parameters is given. Ion current, voltage, and gas  
pressure, and the influence of cathode/substrate spacing on  
the deposition rate are investigated. It was found that about  
2 cm between anode and cathode is optimal. Under optimal  
working conditions deposition rate of 100 nm/s (for gold)  
was obtained. Precise control of electrical parameters  
provides very good reproducibility of sputtered films. (9  
refs.)  
Description: SPUTTERING; VAPOUR DEPOSITION; THIN FILM  
CIRCUITS; VACUUM TECHNIQUES  
Identifier: DC CATHODE SPUTTERING; DEPOSITION PARAMETERS;  
VOLTAGE; GAS PRESSURE; CATHODE/SUBSTRATE SPACING; DEPOSITION  
RATE; OPTIMAL WORKING CONDITIONS; REPRODUCIBILITY; THIN FILM  
SPUTTERING; ION CURRENT DENSITY  
02  
Section Class Codes: B2524, B1267, A9112, A0634  
Unified Class Codes: SMEAA, ADGKAT, ZGCAAX, BGGEAR  
Language: SLOVENE

B2980B A7579544, B7543380  
A HYBRID THIN-FILM MULTICHANNEL BIOTELEMETRY TRANSMITTER  
FILSHIE, J.H.; MCREE, I.J.  
AGRICULTURAL RES. COUNCIL'S POULTRY RES. CENTRE, EDINBURGH,  
SCOTLAND  
IEE. INTERNAT. SOC. HYBRID MICROELECTRONICS, IEE. INST.  
PHYS., 1975  
SIN 0 903749 25 B  
CONFERENCE ON HYBRID MICROELECTRONICS, 49-56  
9-11 Sept. 1975, LOUGHBROOK, LEICS., ENGLAND  
1975  
THERE, LONDON, ENGLAND  
The requirements of a modern biotelemetry system are  
discussed together with the problems of measuring biological  
parameters. Hybrid thin-film methods provide a good solution  
to the problem. Multi-channel FM/FM VHF radio-transmitters for  
measuring temperature and biopotentials have been designed and  
constructed. A radio-frequency-operated switch is also  
described which allows implanted transmitters to be switched  
remotely (9 refs.)  
Description: TELEMETRY EQUIPMENT; BIOMEDICAL TECHNIQUES  
AND INSTRUMENTS; THIN FILM CIRCUITS; RADIO TRANSMITTERS;  
HYBRID INTEGRATED CIRCUITS  
Identifier: HYBRID THIN FILM MULTICHANNEL BIOTELEMETRY  
TRANSMITTER; TEMPERATURE MEASUREMENTS; BIOPOTENTIAL  
MEASUREMENTS; RADIO FREQUENCY OPERATED SWITCH  
06  
Section Class Codes: B4260, B3518, A0694, B2540, B2524  
Unified Class Codes: BECAF, FECKA, BGZKAD, SMEAB, SMEAH

829164 A7579535. B7543379

RADIOTELEMETRY OF AVIAN SHANK TEMPERATURE USING A THIN-FILM MICROCIRCUIT. DUNCAN, I.J.H.; FILSHIE, J.H.; MCGEE, I.J. AGRICULTURAL RES. COUNCIL'S POULTRY RES. CENTRE, EDINBURGH, MED. AND BIOL. ENG. (GB) VOL.13. NO.4 544-50 JULY 1975

THE SHANK TEMPERATURE OF A BIRD IS ONE INDICATOR OF ITS BEHAVIOURAL STATE. A RADIOTELEMETRY SYSTEM HAS BEEN DEVELOPED CONSISTING OF A THIN-FILM RADIOTRANSMITTER AND A DECODING CIRCUIT USING PULSE-RATIO MODULATION. OF A SURFACE SUBSTRATE LINEARISED FOR USE WITH A THERMISTOR. THE SUBSTRATE FREQUENCY MODULATES A 25-30 MHZ CARRIER OPERATING IN NEAR-FIELD CONDITIONS. THE TRANSMITTER CAN BE USED EXTERNALLY OR MAY BE IMPLANTED. UNDER EXPERIMENTAL CONDITIONS TEMPERATURE DRIFT DOES NOT EXCEED 0.1 DEG. C. TEMPERATURE CHANGES IN RESPONSE TO STRESS SITUATIONS ARE REPORTED AND DISCUSSED. (8 Refs.)

IDENTIFIERS: TELEMETRY; TEMPERATURE MEASUREMENT; HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS; TELEMETERING EQUIPMENT; BIOLOGICAL TECHNIQUES AND INSTRUMENTS; IDENTIFIERS: AVIAN SHANK TEMPERATURE; BIRD; BEHAVIOURAL STATE; RADIOTELEMETRY; RADIOTRANSMITTER; DECODING CIRCUIT; THIN FILM HYBRID IC

02  
Section Class Codes: B4260, B3518, B2524, A0694  
Unified Class Codes: BECHAF, FECKAW, SHAEAH, SMEAB, BG2KAQ

829165 B7543930

A HYBRID MICROCIRCUIT APPROACH TO TELEMETRIC SWALLOWS CAPSULES. LING, F.M.

ELECTRICAL ENGN. DEPT., UNIV. OF WYOMING, LARAMIE, WY, USA  
PROCEEDINGS OF THE 12TH ANNUAL ROCKY MOUNTAIN BIOENGINEERING INSTRUMENTATION SYMPOSIUM, 6-1-4 1975

1-4 APRIL 1975 DENVER, COLO., USA  
THE DEVELOPMENT OF CHIP COMPONENTS HAS MADE POSSIBLE A REDUCTION IN THE SIZE OF DISCRETE COMPONENT CIRCUITS WITH ONLY A MODERATE INCREASE IN THE COMPLEXITY OF FABRICATION. THE SIMPLEST TECHNIQUE IS TO MOUNT THICK FILM RESISTORS AND CAPACITORS TOGETHER WITH SEMICONDUCTOR DEVICES IN THE LID (LEADLESS, INVERTED DEVICE) PACKAGE AND TO INTERCONNECT THEM USING A MICROPRINTED CIRCUIT SUBSTRATE. A FURTHER DECREASE IN SIZE CAN BE REALIZED IF WIRE BONDING IS USED, WITH THE ADDED ADVANTAGE THAT A WIDER RANGE OF SEMICONDUCTOR DISCRETE DEVICES

1-2 1975-1976 SWALLOWS ARE AVAILABLE. THIN FILM RESISTORS CAN BE USED IN INTEGRATED CIRCUITS. IN 1975, 2000 1/2

Identifiers: HYBRID MICROCIRCUIT APPROACH; TELEMETRIC SWALLOWS CAPSULES; CHIP COMPONENTS; DISCRETE COMPONENT CIRCUITS; THICK FILM RESISTORS; SEMICONDUCTOR DEVICES; MICROPRINTED CIRCUIT SUBSTRATE; WIRE BONDING; THICK FILM RESISTORS; LEADLESS INVERTED DEVICE PACKAGE; THIN FILM

06

Section Class Codes: B4640, B3518, B4260

Unified Class Codes: ZRAGAF, FECKAW, BECHAF

Identifiers: HYBRID MICROCIRCUIT APPROACH; TELEMETRIC SWALLOWS CAPSULES; CHIP COMPONENTS; DISCRETE COMPONENT CIRCUITS; THICK FILM RESISTORS; SEMICONDUCTOR DEVICES; MICROPRINTED CIRCUIT SUBSTRATE; WIRE BONDING; THICK FILM RESISTORS; LEADLESS INVERTED DEVICE PACKAGE; THIN FILM

06

Section Class Codes: B4640, B3518, B4260

Unified Class Codes: ZRAGAF, FECKAW, BECHAF

B27892 B7542567

THICK FILM DIRECTIONAL COUPLER DESIGN. A COMPARISON OF THEORIES. BATHBRIDGE, P.L.; ROBERTSON, R.J. DUNDEE COLL. OF TECHNOL., DEPT. OF ELECTRICAL AND ELECTRONIC ENG., DUNDEE, SCOTLAND

PHYS. INSTITUT. SOC. HYBRID MICROELECTRONICS, IEE, INST.

SIN 0 90374B 25 B

CONFERENCE ON HYBRID MICROELECTRONICS

83-94 1975

9-11 SEPT. 1975 LOUGHBOROUGH, LEICS., ENGLAND

THE LONDON, ENGLAND

PAPER DESCRIBES THE DESIGN OF 10 DB AND 20 DB

DIRECTIONAL COUPLERS USING TWO DIFFERENT THEORIES. ONE METHOD

USED COMPUTER PROGRAMS TO DETERMINE THE DIMENSIONS AND THE

FILM COUPLERS. IN THE FREQUENCY RANGE 1-2 GHZ IS COMPARED AND

VARIOUS IMPROVEMENTS ARE SUGGESTED. (12 Refs.)

DESCRIPTIONS: DIRECTIONAL COUPLERS; MICROWAVE INTEGRATED

CIRCUITS; HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS;

Identifiers: THICK FILM DIRECTIONAL COUPLER; 1 TO 2 GHZ

06

Section Class Codes: B3290, B1920, B2540, B2522

Unified Class Codes: ENMWA, ETEAO, SMEAB, SMCCAX



1586

827329 07541724  
STABILITY AND FORWARD DIODE VOLTAGE CHARACTERISTICS OF  
CONDUCTIVE EPOXY RESIN BONDED DEVICES  
GELNER, I.  
NEWCASTLE TRANSISTORS LTD., NEWCASTLE, ENGLAND  
-  
I.E.E., INTERNAT. SOC. HYBRID MICROELECTRONICS, IEE, INST.  
PHYS., IEE  
SIN 0 903748 25 8  
CONFERENCE ON HYBRID MICROELECTRONICS 169-79  
9-11 SEPT. 1975, Loughborough, Leics., England  
-  
I.E.E., LONDON, ENGLAND  
-  
The present paper describes the success with which thick film hybrid technology has been developed in Finland as a result of close co-operation between the research establishment and industry. In particular it describes the active role of the university in encouraging industry to make use of this technology in its production (4 refs.)  
: IDENTIFIERS: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS  
HYBRID TECHNOLOGY  
06  
Identifiers: HYBRID MICROELECTRONICS; FINLAND; THICK FILM  
CONDUCTIVE EPOXY RESIN BONDED DEVICES; STABILITY  
CHARACTERISTICS;  
CONDUCTIVE EPOXY RESIN BONDED DEVICES; CURRENT CARRYING  
CAPABILITIES; TRANSISTOR CHIPS; THICK FILM CIRCUITS; STABILITY  
06  
Section Class Codes: B2540, B2522  
Unified Class Codes: SMEAB, SMCCAX

827328 07541722

TECHNOLOGICAL TEACHING OF HYBRID MICROELECTRONICS (THICK FILM)  
LEROY, Y.; DESCARPS, M.; VERNET, M.  
INST. UNIV. DE TECHNOL., UNIV. DES SCI. ET TECH. DE LILLE,  
VILLENEUVE D'ASQ, FRANCE  
-  
I.E.E., INTERNAT. SOC. HYBRID MICROELECTRONICS, IEE, INST.  
PHYS., IEE  
SIN 0 903748 25 8  
CONFERENCE ON HYBRID MICROELECTRONICS (THICK FILM)  
9-11 SEPT. 1975, Loughborough, Leics., England  
-  
HAVI BEEN TAUGHT IN THE DEPARTMENT GENIE ELECTRIQUE (I.U.T.)  
LILLE. SINCE 1973, THE PURPOSE OF THIS TEACHING IS TO REPORT  
EXPERIENCE WITH THIS TEACHING AND TO GIVE A FEW DETAILS ABOUT  
THE DEVICES WHICH WERE STUDIED AND ACHIEVED BY THE STUDENTS  
: IDENTIFIERS: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS  
06  
Section Class Codes: B2540, B2522, B1220  
Unified Class Codes: SMEAB, SMCCAX, ADCAAP

827327 07541721

THE HYBRID MICROELECTRONICS EXPLOSION IN FINLAND  
JARVINEN, E.  
UNIV. OF OULU, OULU, FINLAND

05 827326 B7541720 COMPARATIVE INVESTIGATION OF THICK FILM AND THIN FILM COMPONENTS AND MIC'S UP TO 16 GHZ  
FUKU, W.; SCHILZ, W.  
PHILLIPS FORSCHUNGSLAB, HAMBURG GMBH, HAMBURG, GERMANY  
I.E.E.E. INTERNAT. SOC. HYBRID MICROELECTRONICS, IEE, INST.  
PHYS., IEEF  
Sth 0 903748 25 B CONFERENCE ON HYBRID MICROELECTRONICS 95-100 1975  
9-11 Sept. 1975 LOUGHBOROUGH, LEICS., ENGLAND  
LIRE, LONDON, ENGLAND  
THIN FILM AND THIN FILM TECHNOLOGIES CAN BE APPLIED FOR THE FABRICATION OF MICROWAVE INTEGRATED CIRCUITS. THICK FILM AND THIN FILM TECHNIQUE WHILE THIN FILM HAS THE ADVANTAGE OF EXCELLENT ACCURACY OF THE TRANSMISSION LINE WIDTH AND EDGE DEFINITION, THICK FILM TECHNIQUE OPENS THE POSSIBILITY OF DIRECT METALLIZATION ON BOTH SIDES AND IN THE HOLES. INTEGRATION OF RESISTORS AND CAPACITORS IN THE SAME FABRICATION PROCESS, THIS CAN BE A COST REDUCTION FACTOR IN MASS PRODUCTION. HOWEVER, THE LIMITED ACCURACY OF THICK FILM LIMITS THE UPPER FREQUENCY OF THE CIRCUIT. THE PURPOSE OF THE INVESTIGATION REPORTED HERE WAS TO COMPARE THE ELECTRICAL BEHAVIOR OF 1. LUMPED ELEMENTS, RESISTORS AND CAPACITORS; 2. A PASSIVE CIRCUIT, A POWER SPLITTER, BOTH IN THICK FILM AND THIN FILM AND 3. TO TEST A MORE COMPLEX THICK FILM DEVICE, A MM DETECTOR, WHICH INCLUDES PRINTED RESISTORS AND CAPACITORS (1 Refs.)  
Descriptors: THIN FILM RESISTORS; THIN FILM CAPACITORS; THICK FILM RESISTORS; THIN FILM CIRCUITS; THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; MICROWAVE INTEGRATED CIRCUITS  
Identifiers: THIN FILM COMPONENTS; MIC; 16 GHZ; MICROWAVE INTEGRATED CIRCUITS; RESISTORS; CAPACITORS; LUMPED ELEMENTS; PASSIVE CIRCUIT; POWER SPLITTER; MM DETECTOR; THICK FILM COMPONENTS

06 Section Class Codes: B2540, B2522, B2210, B2524  
Unified Class Codes: SMEAB, SMCCAX, SEEAS, SMMAAR, SMCEAH

05 827323 B7541717 EVALUATION OF CONDUCTIVE VIAS FOR HYBRID MICROCIRCUITS  
HAMPY, R. E.; MORNOOD, D. P.  
Report No.: SAID 74-0047;  
ALBUQUERQUE, N.MEX., USA;  
Contract No.: AT(29-1)-789  
Sept. 1974  
EVALUATION OF CONDUCTIVE VIAS FOR FEED-THROUGH HOLES THROUGH THE SUBSTRATE. TEST SUBSTRATES WERE MADE USING SPUTTERED TANTALUM NITRIDE RESISTOR FILM ON ONE SIDE AND VACUUM EVAPORATED CR-AU FOR THE METALLIZATION ON BOTH SIDES AND IN THE HOLES. PHOTOLITHOGRAPHIC TECHNIQUES WERE DEVELOPED TO PROVIDE PRODUCTION OF THE GOLD IN THE HOLES DURING THE ETCHING PROCEDURE. INFORMATION IS PRESENTED ON MEASURED VIA RESISTANCE, TEMPERATURE CYCLING (-55° TO 125°C), HIGH TEMPERATURE AGING (150°C), CURRENT CARRYING CAPABILITY, THE EFFECTS OF THE TANTALUM ETCHING ON THE GOLD AS WELL AS FILM MORPHOLOGY STUDIES. THE RESULTS INDICATE THAT THE TECHNIQUES AND PROCEDURES PROVIDE CONDUCTIVE VIAS THAT WILL MEET THE ELECTRICAL AND TEMPERATURE REQUIREMENTS.  
Descriptors: HYBRID INTEGRATED CIRCUITS; INTEGRATED CIRCUIT PRODUCTION; CONDUCTIVE VIAS; HYBRID MICROCIRCUITS; IDENTIFIERS: VACUUM EVAPORATED CR-AU; METALLIZATION; ETCHING; SUBSTRATE; VIA RESISTANCE; TEMPERATURE CYCLING; HIGH TEMPERATURE AGING; CURRENT CARRYING CAPABILITY; FEED THROUGH HOLES; SPUTTERED TAN RESISTOR FILM; PHOTOLITHOGRAPHY

11 Section Class Codes: B2540  
Unified Class Codes: SMEAB  
Availability: NTIS, SPRINGFIELD, VA. 22161, USA

027125 B7541719 CONFERENCE ON HYBRID MICROELECTRONICS IEE, INST.  
I.E.E.E. INTERNAT. SOC. HYBRID MICROELECTRONICS, IEE, INST.  
PHYS., IEE  
Sth 0 903748 25 B  
11/75 Sept. 1975 LOUGHBOROUGH, LEICS., ENGLAND  
HERE, LONDON, ENGLAND  
THE FOLLOWING TOPICS WERE DEALT WITH: NEW MATERIALS AND TECHNIQUES; EDUCATION AND TRAINING; MANUFACTURING TECHNOLOGY; RELIABILITY AND TESTING, APPLICATIONS. 30 PAPERS WERE PRESENTED, OF WHICH 30 ARE PUBLISHED IN FULL IN THE PRESENT PROCEEDINGS  
Descriptors: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS  
: DESIGN; CIRCUITS; INTEGRATED CIRCUIT PRODUCTION  
: HYBRID CIRCUITS  
: MICROWAVE CIRCUITS  
: PHOTOLITHOGRAPHY  
: THERMOGRAPHY

822722 87541716  
REHYBRID MICROCIRCUIT SOLDERING TECHNIQUES  
OLSON, H. C.; KHAUSS, G. L.  
Report No.: SLA-73-1073;  
Contract No.: AT(25-1)-709  
AUG. 1973  
TO MINIMIZE THE INDUCTANCE CAUSED BY FLYING WIRES IT WAS  
DESIGNABLE TO ATTACH MOST APPLIQUE PARTS TO THE HYBRID CIRCUITS  
USING A SOLDER ALLOY. THE HYBRID CIRCUITS HAVE GOLD  
METALLIZATION TO WHICH THE APPLIQUE PARTS ARE ATTACHED. THE  
SOLDER DEVELOPMENT ACTIVITIES, EQUIPMENT, AND ASSEMBLY  
TECHNIQUES USING A 50 WT. PERCENT LEAD-TINNOMINUM SOLDER ALLOY ARE  
DETAILED.  
Description: HYBRID INTEGRATED CIRCUITS; INTEGRATED CIRCUIT  
PRODUCTION; SOLDERING; LEAD ALLOYS; INDIUM ALLOYS  
Identifiers: HYBRID MICROCIRCUIT SOLDERING; METALLIZATION;  
ASSEMBLY TECHNIQUES; Pb-IN SOLDER ALLOY; APPLIQUE PARTS  
11

Section Class Codes: B2540, B2560

United Class Codes: SMEAAB, SMEAAR

Availability: NTIS, SPRINGFIELD, VA, 22161, USA

822731 87541715  
NEW APPLICATIONS FOR THICK LAYER HYBRID TECHNIQUES  
NEWCASTLE TRANSISTORS LTD., NEWMARKET, ENGLAND  
RADIO ELEKTRON, SCHAU (AUSTRIA)  
1975, Cited: REISKAK

DISCUSSING RESISTANCE PASTES, HYBRID CIRCUITS,  
CAPACITORS, ACTIVE COMPONENTS, ENCAPSULATION, AND THE  
APPLICATION OF SUCH CIRCUITS. THE ARTICLE MENTIONS HOW ITS  
TECHNIQUE FACILITATES REDUCTIONS IN DIMENSIONS, LOWER  
INDUCTANCES AND CAPACITANCES BETWEEN CIRCUIT COMPONENTS AND A  
REDUCED FAILURE RATE THROUGH USING FEWER SOLDERED JOINTS; AND  
SHO'S THAT A WIDE BAND AMPLIFIER PRODUCED BY THIS TECHNIQUE  
WITH A GAIN OF 15.00 OVER A RANGE FROM 40 TO 860 MHZ IS FOUR  
TIMES SMALLER AND MUCH LESS COSTLY THAN A SIMILAR UNIT USING  
PRIMED CIRCUITS AND DISCRETE COMPONENTS.  
Description: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS  
Identifiers: APPLICATIONS: RESISTANCE PASTES; CAPACITORS;  
ACTIVE COMPONENTS; ENCAPSULATION; WIDE BAND AMPLIFIER; THICK  
FILM HYBRID TECHNIQUE  
02

Section Class Codes: B2540, B2522, B1840

United Class Codes: SMEAAB, SMECAAX, ETHAAAB

Language: GERMAN  
Description: THIN FILM RESISTORS; INTEGRATED CIRCUIT  
Production  
Identifiers: THIN FILM RESISTORS; RESISTOR TRIMMING; HYBRID  
MICROCIRCUITS  
06  
Section Class Codes: B2524, B2210  
United Class Codes: SMEAAB, SMEAAS

8227320 87541713  
A VACUUM CENTRIFUGE FOR VOID-FREE POTTING OF IMPLANTABLE  
HYBRID MICROCIRCUITS IN SILICONE

DONALDSON, P. E.K.; SAYER, E.  
INST. OF PSYCHIATRY, NEUROLOGICAL PROSTHESIS UNIT, MEDICAL  
RES. COUNCIL, LONDON, ENGLAND  
Coden: MBEAU  
Report No.: SLA-73-1073;  
Contract No.: AT(25-1)-709  
AUG. 1973  
THE VACUUM CENTRIFUGE HAS BEEN USED FOR POTTING TO A DEPTH  
OF 2.5 MM HYBRID THICKFILM CIRCUITS ON 25 MM X 6 MM SUBSTRATES  
HAVING PRINTED CONDUCTORS, RESISTORS AND CROSSOVER INSULATION  
AND WITH 39 ATTACHED BEAM-LEAD SEALED-JUNCTION TRANSISTORS (3  
refs)  
Description: HYBRID INTEGRATED CIRCUITS; ENCAPSULATION;  
INTEGRATED CIRCUIT PRODUCTION; CENTRIFUGES;  
Identifiers: VACUUM CENTRIFUGE; HYBRID MICROCIRCUITS;  
SILICONE RUBBER; VOID-FREE POTTING  
02  
Section Class Codes: B2540  
United Class Codes: SMEAAB

8227287 87541670  
TRIMMING OF THIN FILM RESISTORS BY SPARK MACHINING  
LAW, H.  
FERRANTI LTD., EDINBURGH, SCOTLAND  
TERE, INTERNAT. SOC. HYBRID MICROELECTRONICS, IEE, INST.  
PHYS., TELE  
SON 0 901748 25 8  
CONFERENCE ON HYBRID MICROELECTRONICS 181-90 1975  
9-11 SEPT. 1975, LOUGHBOROUGH, LEICS., ENGLAND  
LERE, LONDON, ENGLAND  
STARK DISCHARGE MACHINING MAY BE USED AS A METHOD OF  
ADJUSTING THIN FILM RESISTORS. THE CAPITAL COST OF THE  
APPARATUS IS LOW, AND THE METHOD IS FULLY COMPATIBLE WITH  
THOSE AUTOMATIC CONTROL PROCEDURES WHICH HAVE COME TO BE  
ASSOCIATED WITH RESISTOR TRIMMING. IN THE MANUFACTURE OF  
THIN-FILM HYBRID MICROCIRCUITS, UNSATISFACTORY RESULTS ARE  
OBTAINED WHEN THE STARK DISCHARGE CIRCUIT SIMILAR TO THAT USED  
FOR MANY YEARS IN MACHINING BULK MATERIALS IS APPLIED TO THIN  
FILMS. THE CUT LINE IS VARIABLE IN WIDTH AND MAY SHOW  
EXTENSIVE MARGINAL DAMAGE. FURTHER DEVELOPMENT OF THE PROCESS  
HAS LED TO APPARATUS WHICH ALLOWS TRIMMING OF HIGH VALUE  
RESISTORS TO BE READILY ACCOMPLISHED, MAINTAINING CONSISTENT  
QUALITY OF THE CUT LINE, AND MINIMUM DAMAGE TO THE IMMEDIATELY  
ADJACENT FILM  
Description: THIN FILM RESISTORS; INTEGRATED CIRCUIT  
Production  
Identifiers: THIN FILM RESISTORS; RESISTOR TRIMMING; HYBRID  
MICROCIRCUITS  
06  
Section Class Codes: B2524, B2210  
United Class Codes: SMEAAB



827210 B7541661

## THIN-FILM TECHNOLOGY ON THE BASIS OF TANTALUM AND TANTALUM ALUMINUM

SCHAUER, A.

ELEKTRONIK (GERMANY)

VOL.24, NO.9 71-6 SEPT. 1975

DISCUSSES THE MANUFACTURE AND NATURE OF TANTALUM-NITRIDE AND TANTALUM-OXYNITRIDE RESISTORS, BETA-TANTALUM CAPACITORS AND THIN-FILM WIRING. THE ADVANTAGES OF THIN-FILM CIRCUITS ARE POINTED OUT AND TYPICAL APPLICATIONS, SUCH AS 60-MHZ AMPLIFIER, ACTIVE FILTERS, AND TOUCH TONE OSCILLATORS, ARE BRIEFLY DESCRIBED. FINALLY, THERE IS A REPORT ON THE NATURE OF THE TANTALUM-ALUMINUM ALLOYS WITH HIGH ALUMINUM CONTENT DISCLOSED IN THE SIEMENS LABORATORIES AND THEIR IMPORTANCE FOR RC NETWORKS. (23 PAGES)

Identifiers: THIN FILM CIRCUITS; THIN FILM CAPACITORS; THIN FILM RESISTORS; MANUFACTURE; RC NETWORKS; THIN FILM CIRCUITS; TA THIN FILM CIRCUITS; TANTAL THIN FILM CIRCUITS; THIN FILM RESISTORS; THIN FILM CAPACITORS; TEMPERATURE COMPENSATION

02

Section Class Codes: B2524, B2670, B2210

Unified Class Codes: SMEAH, SMEAH, SMEAA, SMEAS

Language: GERMAN

Identifiers: AIR-FIREABLE BASE METAL CONDUCTOR FOR OPTOELECTRONICS; PHOTO PRODUCTS DEPT., E.I. DU PONT DE NEMOURS AND CO., INC., WILMINGTON, DE, USA

WIRE, INTERNAT. SOC. HYBRID MICROELECTRONICS, IEE, INST.

PHYS., IEE, INST.

SIN 0 903781 25 B

CONFERENCE ON HYBRID MICROELECTRONICS 33-41 1975

9-11 SEPT. 1975, LOUGHBOROUGH, LEICS., ENGLAND

This paper describes the physical and electrical properties of a unique series of thick film nickel conductors, capable of being air fired without degradative electrical characteristics. These conductors have direct application as cathodes for all glass fabricated DC plasma displays, typical fabrication procedures of such planar displays with these conductors and companion dielectrics will be presented. Other potential microcircuit applications for this base metal conductor system are described. (2 PAGES)

Identifiers: DISPLAY SYSTEMS; OPTOELECTRONIC DEVICES; THICK FILM CIRCUITS; CONDUCTORS (ELECTRIC)

Identifiers: OPTOELECTRODES; CATHODES; GLASS FABRICATED DC PLASMA DISPLAYS; PLANAR DISPLAYS; MICROCIRCUIT APPLICATIONS; AIR-FIREABLE BASE METAL CONDUCTOR; THICK FILM NI CONDUCTOR

02

Section Class Codes: B2522, B2107, B2404

Unified Class Codes: SMEAA, SMEAC

827273 B7541652

METALLIZATIONS

LEMON, T.H.

RES. LABS., JOHNSON, MATTHEY AND CO., LTD., WEMBLEY, ENGLAND

WIRE, INTERNAT. SOC. HYBRID MICROELECTRONICS, IEE, INST.

PHYS., IEE, INST.

SIN 0 903748 25 B

CONFERENCE ON HYBRID MICROELECTRONICS 23-32 1975

9-11 SEPT. 1975, LOUGHBOROUGH, LEICS., ENGLAND

SOLDERED JOINTS BASED UPON CONVENTIONAL AG-PD METALLIZATIONS RAPIDLY LOSE OVERALL TENSILE STRENGTHS WHEN THE BONDS ARE SUBJECTED TO ELEVATED TEMPERATURES. THIS DEGRADATION IN BOND STRENGTHS HAS BEEN SUBSTANTIALLY ARRESTED BY SELECTING A GLASS FOR USE IN THE METALLIZING COMPOSITION WITH A SOFTENING POINT LYING BETWEEN THE REDUCTION TEMPERATURE OF AG-PD MIXES AND THE STANDARD PEAK FIRING TEMPERATURE. IN THIS WAY, IT IS POSSIBLE TO FORM GLASS-METAL BONDS WHICH ARE SUBJECT TO THE MINIMUM OF PHYSICAL DISTURBANCES DURING NORMAL PROCESSING SCHEDULES. THESE MORE COHERENT LAYERS INHIBIT SURFACE DIFFUSION OF THE ACTIVE SPECIES THEREBY LIMITING THE RATE AT WHICH INHIBIT INTERMETALLICS ARE FORMED. (10 PAGES)

Identifiers: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS

06

Section Class Codes: B2522, B2540

Unified Class Codes: SMEAA, SMEAB

Identifiers: AG-PD METALLIZATIONS; TENSILE STRENGTHS; BOND STRENGTHS; GLASS; REDUCTION TEMPERATURE; PEAK FIRING

Temperature: GLASS METAL BONDS

B27272 B7541651

SUBSTRATE BORING IN THICK FILM MULTILAYERED CIRCUITS

SAVAGE, J.; DAVEY, N.  
MITALL, DIV. AME, ALDERHASTON, ENGLAND  
IEEE, INTERNAT. SOC. HYBRID MICROELECTRONICS, IEE, INST.

PHYS., IEE, 9037AB 25, 8

CONFERENCE ON HYBRID MICROELECTRONICS 17-22 1975

LIVE, LONDON, ENGLAND

THIS PAPER DESCRIBES THE DISTORTION OF ALUMINA SUBSTRATES WHICH OCCURS DURING THICK FILM MULTILAYERED CIRCUIT FABRICATION AND COMPARES THE EFFECT OF A RANGE OF COMMERCIAL INSULANT MATERIALS. THE DISTORTION IS SHOWN, BY DILATOMETRY AND DIRECT OBSERVATION, TO BE DUE TO THERMAL EXPANSION MISMATCH BETWEEN THE INSULANT AND THE ALUMINA. THE PROGRESS OF AN BORING, DURING HEATING AND COOLING CYCLES IS DEMONSTRATED. AN ESTIMATE IS MADE OF THE STRESS LEVELS IN THE INSULANTS AND THE POSSIBLE EFFECT OF THESE STRESSES ON THE RELIABILITY OF THE CIRCUIT ARRAYS IS CONSIDERED. INTEGRATED CIRCUIT

DISCRIPTORS: THICK FILM CIRCUITS; THICK FILM MULTILAYERED CIRCUITS; PRODUCTION; SUBSTRATES; BORING; THICK FILM MULTILAYERED CIRCUITS; INSULATORS; BORING; THICK FILM SUBSTRATES; THERMAL EXPANSION MISMATCH; DISTORTION; ALUMINA SUBSTRATES; INSULANTS; RELIABILITY

06

Section Class Codes: B2522

Unified Class Codes: SMCCAX

THICK FILM MICROCIRCUITS; GAS ABSORPTION; STRUCTURE; SCANNING ELECTRON MICROSCOPE; CHEMICAL COMPOSITION; ATOMIC ABSORPTION SPECTROSCOPY; CONDUCTOR PENETRATION; HYBRID MICROCIRCUITS

06

Section Class Codes: B2522, B2540

Unified Class Codes: SMCCAX, SMCAB

827270 B7541649

CONDUCTION MECHANISMS IN THICK FILM MICROCIRCUITS

VEST, R.W.

LAFAYETTE, IND., USA

REPORT NO.: UNNUMBERED; ISSUED BY: PURPLE RES. FOUND., LAFAYETTE, IND., USA; VEST, R.W.; 31 DEC. 1974  
THE SINTERING KINETICS AND THE RIPENING KINETICS FOR RUO/SUB 2/ PARTICLES IN THE PRESENCE OF A GLASS PHASE, WERE STUDIED BY MEASURING SURFACE AREA, X-RAY LINE BROADENING, SHRINKAGE AND ELECTRICAL RESISTANCE. RESULTS FROM THESE FOUR TECHNIQUES ARE INTERPRETED IN TERMS OF COMPETING PROCESSES WHICH OCCUR DURING THICK FILM RESISTOR FIRING. THE SHEET RESISTANCE OF THICK FILM RESISTORS AS A FUNCTION OF RUO/SUB 2/GLASS RATIOS, IS REPORTED. DESCRIPTORS: THICK FILM RESISTORS; THICK FILM CIRCUITS; IDENTIFIERS: THICK FILM MICROCIRCUITS; SINTERING KINETICS; RIPENING KINETICS; RUO/SUB 2/; X-RAY LINE BROADENING; SHRINKAGE; ELECTRICAL RESISTANCE; THICK FILM RESISTOR FIRING

11

Section Class Codes: B2522, B2210

Unified Class Codes: SMCCAX, SMCAB, SEEAS

Availability: NTIS, SPRINGFIELD, VA. 22161, USA

B27271 B7541650

SUBSTRATE AREA, STRUCTURE AND COMPOSITION OF DEBASED ALUMINA

SUBSTRATES, M.V.; GUNNELL, G.E.  
CILFMAN, M.V.; GUNNELL, G.E.  
STANDARD TELECOMMUNICATION LABS, LTD., HARLOW, ENGLAND  
IEEE, INTERNAT. SOC. HYBRID MICROELECTRONICS, IEE, INST.

PHYS., IEE, 9037AB 25, 8

CONFERENCE ON HYBRID MICROELECTRONICS 1-16 1975

9-14 Sept. 1975, Loughborough, Leics., England

THE SURFACE AREAS OF A NUMBER OF COMMERCIAL ALUMINA SUBSTRATES USED FOR THICK FILM MICROCIRCUITS HAVE BEEN DETERMINED USING THE BRUIER, ENNETT AND TELLER (B.E.T.) METHOD OF GAS ABSORPTION. THE DETAILED STRUCTURE OF THE SURFACES AND OF FRACTURED CROSS-SECTIONS OF SUBSTRATES WERE EXAMINED ON A SCANNING ELECTRON MICROSCOPE (SEM), AND THEIR CHEMICAL COMPOSITION DETERMINED BY ATOMIC ABSORPTION SPECTROSCOPY. CONDUCTOR GLAZE PENETRATION AND POSSIBLE RUN-OUT IS SHOWN TO BE RELATED TO BOTH SUBSTRATE COMPOSITION AND METAL STRUCTURE. RESISTOR CHARACTERISTICS ARE SHOWN TO DEPEND ON THE NUMBER OF UNITS INTEGRATED CIRCUITS; THICK

827117 B7541302, C7525448  
TOLERANCE ANALYSIS OF SUPERCONDUCTING CIRCUITS  
KITSCHKE, P.  
SFTIEN INFORMATIONSTECHNIK UND THEORETISCHE ELEKTROTECHNIK,  
TH. LUMENAU, GERMANY  
91-100, 1975, Content: WZTHAP  
MISS. 2 TECH. HOCHSCH. LUMENAU (GERMANY) VOL.21, NO.1  
DISCUSSES TECHNIQUES OF NUMERICAL TOLERANCE ANALYSIS OF  
THESE CIRCUITS, TAKING INTO ACCOUNT THE INFLUENCE ON PERFORMANCE  
DUE TO TOLERANCES IN MECHANICAL DIMENSIONS, DUE TO VARIATIONS  
OF NUMERICAL TEMPERATURES, AND DUE TO CHANGES IN DYNAMIC LOADING.  
SOM RESULTS ON TRANSIENT PERFORMANCE OF CYCROTHERM NETWORKS ARE  
SHOWN (11 Refs.)  
Descriptor: CYCROTHERM; COMPUTER-AIDED CIRCUIT ANALYSIS; SUPERCONDUCTING  
DEVICES; CYCROTHERM; THIN FILM CIRCUITS; NUMERICAL TOLERANCE  
ANALYSIS; VARIATIONS OF WORKING TEMPERATURES; DYNAMIC LOADING;  
TRANSIENT PERFORMANCE; CYCROTHERM NETWORKS  
02

Section Class Codes: C0B42, B2340, B1620  
United Class Codes: WMEEQ, SGAAAL, EREAAE  
Language: GERMAN

SEPT. 1975 Coden: 1CTACV  
APPLICATION OF DOUBLE LAYER RC DISTRIBUTED LINES IN THE  
DESIGN OF LOW-PASS, BAND-PASS AND HIGH-PASS FILTERS IS  
CONSIDERED IN THIS COMMUNICATION. REALIZATION OF THESE FILTERS IS  
EMPLOYING TWO DOUBLE LAYER LINES AND A DIFFERENCE AMPLIFIER  
USING DOMINANT ROOT APPROACH IS ALSO PRESENTED (5 Refs.)  
Descriptor: ACTIVE FILTERS; DISTRIBUTED PARAMETER NETWORKS;  
LINEAR NETWORK SYNTHESIS; THIN FILM CIRCUITS  
Identifiers: ACTIVE FILTERS; DOUBLE LAYER; RC DISTRIBUTED  
LINES; DIFFERENCE AMPLIFIER; DOMINANT ROOT; LOW PASS; BAND  
PASS; HIGH PASS; INTEGRATED CIRCUIT; THIN FILM CIRCUIT;  
RESISTIVE SHEETS; DIELECTRIC SHEETS  
02

Section Class Codes: B1B80, B1B50, B1620, B2524

Unified Class Codes: E7RAAM, E7RAAH, EREAAE, SMCEAH

B26802 B7541093  
A FAST THICK FILM AMPLIFIER  
ROBERTSON, J.; ANDERSON, B.  
ELECTRICAL ENGNG. DEPT.,  
SCOTLAND  
IEE, INTERNAT. SOC. HYBRID MICROELECTRONICS, IEE, INST.  
PHYS., IEE  
SIN 0 90348 25  
CONFERENCE ON HYBRID MICROELECTRONICS, 77-92  
9-11 SEPT. 1975, LOUGHBOROUGH, LEICS., ENGLAND  
IEE, LONDON, ENGLAND  
DESCRIBES A THICK FILM HYBRID PREAMPLIFIER. THE PREAMPLIFIER  
FUNCTIONED AS AN AMPLIFIER WITH A 50 OMEGA INPUT IMPEDANCE  
BETWEEN A PHOTOTRANSISTOR TUBE AND A DISCRIMINATOR STAGE. IT  
WAS DESIGNED TO PROVIDE A GAIN OF 1 WITH A RISETIME OF 1 NS.  
SMALL SIZE WAS DICTATED BY TRANSIT TIME AND CAPACITANCE  
CONSIDERATIONS, BUT ALSO BY THE REQUIREMENT TO STACK 8  
PREAMPLIFIER CIRCUITS VERTICALLY WITHIN A 1.55SECONDS (34.3  
MM) WIDE 110MS MODULE  
Descriptor: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS  
Identifiers: FAST THICK FILM AMPLIFIER; HYBRID PREAMPLIFIER;  
INPUT IMPEDANCE; PHOTOMULTIPLIER TUBE; DISCRIMINATOR STAGE;  
GAIN; RISETIME; CAPACITANCE CONSIDERATIONS; TRANSIT TIME  
06

Section Class Codes: B1B80, B2522, B2540  
Unified Class Codes: E7RAAB, SMCCAX, SMEAAAB

B26964 B7541204  
DESIGN OF ACTIVE FILTERS USING DOUBLE LAYER RC DISTRIBUTED  
LINES  
NELLAKANTAN, M.N.  
SCHOOL OF ELECTRICAL ENGNG., CALICUT REGIONAL ENGN. COLL.,

B26101 A7541092

A THICK FILM WIDE BAND AMPLIFIER

HEATHINGTON, D.R.  
NEWMARKT TRANSISTORS LTD., NEARMARKT, ENGLAND  
I.E.E., INTERNAL SOC. HYBRID MICROELECTRONICS, IEE, INST.

PHYS., I.E.E.

511, Q 00374B 25 B

CONFERENCE ON HYBRID MICROELECTRONICS 60-76 1975

9-11 SEPT. 1975, LONDON, ENGLAND

LEICS., U.K.

THE PAPER DESCRIBES THE CONVERSION FROM PRINTED CIRCUIT TO  
THICK FILM HYBRID CIRCUIT TECHNOLOGY OF A WIDE BAND AMPLIFIER  
USED IN THE INPUT OF A VIDEO TAPE RECORDER. THE AMPLIFIER  
SPECIFICATION IS 14 DB GAIN FROM 40 TO 1000 MHZ. THE THICK FILM  
LAYOUT IS DESCRIBED IN DETAIL AND THE PERFORMANCE DIFFERENCES  
BETWEEN PLASTIC 'T' PACK ACTIVE DEVICES AND NAKED CHIP EPOXY  
BONDED DEVICES ARE SHOWN.

DISCLOSURES: WIDEBAND AMPLIFIERS: THICK FILM CIRCUITS:

HYBRID INTEGRATED CIRCUITS

Identifiers: THICK FILM WIDE BAND AMPLIFIER; THICK FILM  
HYBRID CIRCUIT TECHNOLOGY; VIDEO TAPE RECORDER; 14 DB GAIN; 40  
TO 1000 MHZ; PLASTIC 'T' PACK ACTIVE DEVICES; NAKED CHIP EPOXY  
BONDED DEVICES

06

Section Class Codes: B1840, B2522, B2540

Unified Class Codes: E1HAB, SMCAAB, SMCCAB

DESCRIBES ACOUSTIC 13 W POWER AMPLIFIER BASED ON THICK-FILM  
TECHNOLOGY USING NON-ENCAPSULATED MEDIUM AND HIGH-POWER  
SEMICONDUCTOR. THE AMPLIFIER MAY BE USED IN CONSUMER PRODUCTS  
(HIGH STANDARD RADIO EQUIPMENT, ELECTROACOUSTIC DEVICES, ETC.)  
DESCRIPTIONS: THICK FILM CIRCUITS; POWER AMPLIFIERS: RADIO  
RECEIVERS; AUDIO-FREQUENCY AMPLIFIERS  
Identifiers: HIGH POWER SEMICONDUCTORS; HIGH STANDARD RADIO  
EQUIPMENT; THICK FILM TECHNOLOGY; ACOUSTIC 13 W POWER  
AMPLIFIER; NON-ENCAPSULATED MEDIUM; ELECTROACOUSTIC DEVICES

02

Section Class Codes: B378C, B1840, B3740, B2522

Unified Class Codes: FKRAAF, E1HAB, F1GAAM, SMCCAB

Language: POLISH

B17705 B7537697

EARLY PRODUCTION HISTORY ON HYBRID MICROCIRCUITS CONTAINING  
BEAM-LEAD SEMICONDUCTORSReport No.: BOX-613-1116-REV: Issued by: BENDIX CORP.,  
WILEY T. A.  
KANSAS CITY, MO, USA;  
Contract No.: A1129-11-613AUG. 1974  
DATA FROM HYBRID MICROCIRCUIT PROTOTYPE DEVELOPED THAT THE  
EARLY CODED ELECTRONIC-SWITCH PRODUCTION IS MORE RELIABLE THAN THE CHIP-AND-WIRE  
BEAM-LEAD DEVICES ARE. MORE RELIABLE THAN THE CHIP-AND-WIRE  
ACTIVE DEVICES USED IN PREVIOUS APPLICATIONS. YIELDS AT THE  
VARIOUS PROCESSING LEVELS WERE BETTER THAN EXPECTED. AND THE  
OVERALL MICROCIRCUIT YIELD WAS MORE THAN 50 PERCENT. BECAUSE  
OF STRONG QUALITY REQUIREMENTS THIS YIELD IS CONSIDERED  
ACCEPTABLE, BUT IS IMPROVING WITH CUMULATIVE PRODUCTION  
EXPERIENCE. SEVEN TYPES OF MICROCIRCUITS FOR THE CODED SWITCH  
ARE NOW MANUFACTURED ON A SCHEDULED BASIS. AND CURRENT  
PROBLEMS ARE NOT SUFFICIENT TO AFFECT PRODUCTION SCHEDULES.  
Identifiers: INTEGRATED CIRCUIT PRODUCTION; CIRCUIT  
RELIABILITY; BEAM-LEAD DEVICES; HYBRID INTEGRATED CIRCUITS;  
SEMICONDUCTOR SWITCHES

B26011 B7540994

1 MHZ TO 1.5 GHZ THIN-FILM AMPLIFIER FEATURES THREE STAGES  
IN A TO-3 CAN

HORNS, G.

AVANTIK INC., SANTA CLARA, CA, USA

MICRODOME SYSTEMS NEWS (USA) VOL. 5, NO. 3 46-7 JUNE-JULY

1975 Coden: MW5A9

BY EXTENDING THE CONCEPT OF THIN-FILM WIDEBAND AMPLIFIERS TO  
INCLUDE MULTIPLE STAGES, THIS NEW UNIT OFFERS GAIN,  
PERFORMANCE AND COST BENEFITS.

Identifiers: MICROWAVE AMPLIFIERS; THIN FILM CIRCUITS;

SOLID-STATE MICROWAVE CIRCUITS; MICROWAVE INTEGRATED CIRCUITS;

HYBRID INTEGRATED CIRCUITS

Identifiers: AMPLIFIER; 1 MHZ TO 1.5 GHZ; THIN FILM; THREE  
STATE; SINGLE SUBSTRATE; MODULAR; STABILITY; COST BENEFIT

02

Section Class Codes: B1820, B2540, B2524, B1840

Unified Class Codes: E1EAD, SMCAAB, SMCCAB

B18972 B7539901  
THICK-FILM TECHNOLOGY APPLIED IN POWER CIRCUITS-13 W  
Identifiers: 1 MHZ TO 1.5 GHZ; THIN FILM; THREE STATE; SINGLE SUBSTRATE; MODULAR; STABILITY; COST BENEFIT

B17782 B7537693 A PHOTORESIST-CHARACTERIZATION APPROACH TO HYBRID-MICROCIRCUIT DIMENSIONAL CONTROL

BRIDX CORP., KANSAS CITY, MO, USA  
MICRO-ELECTRONICS (GB) VOL. 5, NO. 4 25-31 1974 Coden: M1C63Y  
TO KEEP THE CRITICAL ELECTRICAL PARAMETERS OF UNTRIMMED HYBRID MICROCIRCUIT NETWORKS WITHIN REQUIRED TOLERANCES, THE DIMENSIONAL INTEGRITY OF THE CIRCUIT PATTERN MUST BE CAREFULLY MAINTAINED DURING PROCESSING. THIS CAN BE ACCOMPLISHED BY MANIPULATING FIVE PHOTOLITHOGRAPHIC PROCESSING PARAMETERS: EXPOSURE, ENERGY, PHOTORESIST DEVELOPMENT TIME AND SOLUTION CONCENTRATION, PHOTORESIST THICKNESS UNIFORMITY, DEGREE OF ETCHANT UNDERCUTTING, AND THE PREDATE TIME-TEMPERATURE PRODUCT. BY ADJUSTING THE RELATIVE DOMINANCE OF THESE PARAMETERS, AND BY OPTIMIZING THE VALUE OF EACH, IT IS POSSIBLE TO RENDER OVERALL PATTERN DIMENSIONS RELATIVELY INSENSITIVE TO NORMAL PROCESS VARIATIONS. THIS ARTICLE DESCRIBES PROCESS CHARACTERIZATION AND CONTROL TECHNIQUES BY WHICH THE DIMENSIONAL INTEGRITY OF LIGNE WIDTHS AS NARROW AS 5.0 MILS (127 MICRUMETRES) CAN BE MAINTAINED TO WITHIN +OR- 1 PER CENT (15, Ref. 1).

Designers: HYBRID INTEGRATED CIRCUITS: THIN FILM CIRCUITS; PHOTORESISTS; PHOTOLITHOGRAPHY  
Manufacturers: HYBRID MICRO CIRCUIT; PHOTOLITHOGRAPHIC EXPOSURE; ENERGY; PHOTORESIST DEVELOPMENT TIME; SOLUTION CONCENTRATION; ETCHANT; PROCESS CHARACTERIZATION

02 Section Class Codes: B2540, B2524  
Unified Class Codes: SMEAB, SMEAH

B17781 B7537692 FINER LINE SCREEN PRINTING YIELDS AS A FUNCTION OF PHYSICAL DESIGN PARAMETERS  
WILSTER, R.  
HONEYWELL INFORMATION SYSTEMS, BILLERICA, MA, USA

1974-1975 Coden: IETMC  
THE CURRENT DESIGN TRENDS IN THICK FILM HYBRIDS IS TOWARD LARGER SUBSTRATE SIZE AND NARROWER CONDUCTOR LINES. THIS PAPER DOCUMENTS THE RESULTS OF A STUDY UNDERTAKEN TO DETERMINE THE EFFECT OF LINE WIDTH AND SPACING, SUBSTRATE SIZE, AND CONDUCTOR LENGTH ON THE OCCURRENCE OF COMMON SCREEN PRINTING DEFECTS. DEVELOPMENT OF A SCREEN PRINTING TEST PATTERN AND A DATA REDUCTION SOFTWARE ROUTINE IS ALSO DESCRIBED. RECOMMENDATIONS FOR SELECTION OF LINE WIDTH/SPACING AND SUBSTRATE SIZE ARE PRESENTED.

Designers: HYBRID INTEGRATED CIRCUITS

Manufacturers: DESIGN; LINE WIDTH; SPACING; SUBSTRATE SIZE; DATA REDUCTION

02 Section Class Codes: B2540, B2522

Unified Class Codes: SMEAB, SMECA

B17780 B7537691 SEMICONDUCTOR CHIP ATTACHMENT WITH SMALL BUMP FLIP CHIPS

WAITE, G.C.  
HONEYWELL INFORMATION SYSTEMS, BILLERICA, MA, USA  
1974-1975 Coden: IETMC  
IEEE TRANS. MANUF. TECHNOL. (USA) VOL. MFT-4, NO. 1 8-13  
SEPT. 1975  
IT HAS BEEN REPORTED ELSEWHERE THAT THE RATIO OF THE DIAMETER TO THE HEIGHT OF A REFLUX SOFTENED FLIP-CHIP PAD SHOULD BE LESS THAN 2:1. THIS GEOMETRY PERMITS A DUCTILE MATERIAL TO ACCEPT THE STRAIN CAUSED BY DIFFERENCES IN THERMAL EXPANSION COEFFICIENTS OF SILICON AND ALUMINA. HOWEVER, TO DEPOSIT A SUFFICIENT MATERIAL ON A SEMICONDUCTOR CHIP TO ACHIEVE THIS GEOMETRY HAS USUALLY MEANT CHIP PAD REQUESTS AND THE RESULTING COSTLY MASK CHANGES. THIS PAPER DESCRIBES METHODS OF DEPOSITING SUFFICIENT MATERIAL ON A THICK FILM SURFACE THAT TO PERMIT USE OF CHIPS WITH REDUCED BUMP VOLUME. DETAILS IN THE PAPER DESCRIBE THE VOLUME CALCULATIONS AND ARTWORK DESIGN FOR DEPOSITION OF SOLDER CENSE BY SCREEN PRINTING. SELECTION AND DEFINITION OF A DIELECTRIC GLAZE MATERIAL TO LIMIT THE AREA OF SOLDER WETTING ON THE SUBSTRATE PADS IS ALSO DESCRIBED. THE TEST VEHICLE USED IN THE STUDY IS A SIMPLE 2-BIT/10 COUNTER UTILIZING LAMEL GATES. IT WAS FABRICATED IN MULTILAYER FORMAT FOR COMPARISON OF OPERATING PARAMETERS BETWEEN CUTTING BACK BONDED AND SOLDER BONDED CHIPS. (5 Refs.)

Designers: INTEGRATED CIRCUIT PRODUCTION; THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS  
Manufacturers: SMALL BUMP FLIP CHIPS; THICK FILM SUBSTRATE; VOLUME CALCULATIONS; ARTWORK DESIGN; DEPOSITION; SOLDER CREAM; SCREEN PRINTING; DIELECTRIC GLAZE MATERIAL; SEMICONDUCTOR CHIP ATTACHMENT; HYBRID INTEGRATED CIRCUIT MANUFACTURE

02 Section Class Codes: B2540, B2522

Unified Class Codes: SMEAB, SMECA

817718 B7537604  
DESTRUCTABLE MICROELECTRIC CIRCUIT ELEMENT

KAPP, E. J.

Patent No.: USA 387543

Assignee: US NAVY

Filed: 16 OCT 1970

1 APRIL 1975  
THE DISCLOSURE COMPRISES A THIN FILM CIRCUIT SUBSTRATE OF CERAMIC MATERIAL; A FILM CONDUCTOR OF AN EXOTHERMIC MIXTURE OF ALUMINUM-PALLADIUM, EVAPORATED ON THE SUBSTRATE TO UNDERLIE A THIN FILM CIRCUIT AT STRATEGIC PLACES OF DESTRUCTION; A THIN FILM OF SILICON MONOXIDE OVERLYING THE FILM CONDUCTOR; A THIN FILM CIRCUIT DEPOSITED OVER THE SILICON MONOXIDE FILM WITH STRATEGIC PORTIONS OVERLYING THE CONDUCTING FILM, AND A SWITCHED PULSING CIRCUIT WHEREBY THE PULSES ENERGIZE THE CONDUCTING FILM TO PRODUCE EXOTHERMIC REACTION TO DESTROY THE THIN FILM CIRCUIT AT STRATEGIC PLACES

Descriptors: THIN FILM CIRCUITS

Identifiers: THIN FILM CIRCUIT; FILM CONDUCTOR;

SILICON MONOXIDE; SWITCHED PULSING CIRCUIT; EXOTHERMIC

REACTION; SELFSTRUCTURE THIN FILM CIRCUIT

On

Section Class Codes: B2524

Unified Class Codes: SMCEAH

817716 B7537602  
PROCESS FOR MANUFACTURING A CONDUCTIVE FILM FOR A THIN FILM INTEGRATED CIRCUIT DEVICE

SAITO, A.

Patent No.: USA 3059367

Assignee: NIPPON ELECTRIC CO.

LTD Filed: 3 JAN 1973

Priority Date: 27 DEC 1972

4 MARCH 1975  
THE PROCESS CONSISTS IN FORMING A FILM OF A FIRST HIGH-CONDUCTIVITY METAL ON AN INSULATOR BASE PLATE; FORMING A DIFFUSION PREVENTING INSULATOR FILM ON THE METAL; AND SPUTTERING A SECOND METAL SUSCEPTIBLE TO ANODIC FILM FORMING OXIDATION ONTO THE INSULATOR FILM, WHICH IS OF SUCH THICKNESS AS TO PERMIT PARTICLES OF THE SECOND METAL TO PENETRATE AT A MULTIPlicity OF LOCATIONS, WHILE LEAVING INTACT A SUFFICIENT INSULATING FILM SUBSTANTIALLY TO PREVENT THE FORMATION OF AN ALLOY OF THE FIRST AND SECOND METALS, WHEREBY A COMPOSITE FILM IS PRODUCED HAVING A SPECIFIC CONDUCTIVITY HIGHER THAN THAT OF EITHER METAL  
Descriptors: INTEGRATED CIRCUIT PRODUCTION; THIN FILM CIRCUITS; SPUTTERING  
Identifiers: CONDUCTIVE FILM; THIN FILM INTEGRATED CIRCUIT; INSULATOR BASE PLATE; DIFFUSION PREVENTING INSULATOR FILM; SPUTTERING; COMPOSITE FILM; SPECIFIC CONDUCTIVITY

08

Section Class Codes: B2524

Unified Class Codes: SMCEAH

817715 B7537601  
PROCESS OF PRODUCING A THIN FILM CIRCUIT

SUMI, N.

Patent No.: USA 3066713

Assignee: IWATSU ELECTRIC CO.

LTD Filed: 5 NOV 1971

Original Patent Appl. No.: JAPAN 45-19262

Priority Date: 28 DEC 1970

18 FEB 1975

THE PROCESS INVOLVES APPLICATION OF AN ANTOXIDATION MASK TO A CONDUCTIVE FILM AND ANODISING THE UPPER SURFACE OF THE UNOXIDISED FILM AS A BASE FOR DEPOSITION OF A METAL PATTERN FORMING A THIN FILM CAPACITOR  
Descriptors: THIN FILM CAPACITORS; THIN FILM CIRCUITS  
Identifiers: THIN FILM CIRCUIT; ANTOXIDATION MASK; CONDUCTIVE FILM; ANODISING; METAL PATTERN; THIN FILM CAPACITOR  
OB  
Section Class Codes: B2524, B2670  
Unified Class Codes: SMCEAH, SNAARB17713 A7557509, B7537509  
X-RAY DIFFRACTION STRESS MEASUREMENTS IN THIN FILMS (ON SUBSTRATE)

LONDON, T. J. J. SPENCER, T. H.

WESTERN ELECTRIC CO., HAWTHORNE STATION, CHICAGO, IL, USA

SOLID STATE TECHNOL. (USA) VOL.18, NO.7 JULY 1975

Coron: SSTEAP  
Describes: AN ACCURATE, LABOR SAVING METHOD REQUIRING NO SPECIAL DIFFRACTION ATTACHMENTS FOR THIN FILM CIRCUITS. IMPROVED RESULTS WERE OBTAINED BY THE INTRODUCTION OF A CALIBRATION STANDARD, THROUGH THE USE OF THIS STANDARD, ANGULAR MEASUREMENTS OF +0R-0.005 DEGREES WERE ATTAINED. THE TECHNIQUE CONSISTS OF SCANNING A THIN GOLD FILM SAMPLE AND A DIAMOND STANDARD SIMULTANEOUSLY. THIS IS ACCOMPLISHED BY APPLYING FINE DIAMOND PARTICLES ON THE SURFACE OF THE GOLD FILM. PRIOR TO X-RAY SCANNING, ACCURACY HAS BEEN FURTHER AIDED IN THE SUBSEQUENT MATHEMATICAL OPERATIONS USED TO OBTAIN A STRESS VALUE. A PRECISE PARAMETER MEASUREMENT IS OBTAINED ON WHICH THE STRESS CALCULATIONS ARE MADE (2 Refs.)  
Descriptors: X-RAY DIFFRACTION EXAMINATION OF MATERIALS; STRESS MEASUREMENT; METALLIC THIN FILMS; THIN FILM CIRCUITS  
Identifiers: DIAMOND STANDARD; FINE DIAMOND PARTICLES; X-RAY DIFFRACTION STRESS MEASUREMENT; STRESS IN THIN FILMS; AU THIN FILMS; + OR -0.005 DEGREE ACCURACY

02

Section Class Codes: A0605, A0692, B2524, A9170, B126B

Unified Class Codes: BGCAAP, BGZEAH, ZGTAAB

DIALOG FILE#13: INSPEC-ELEC &amp; COMPUT 69-77/15517 (COPR. I.E.E.) (Item 2B2 of 300) User 674 28Oct77

B17711 B7537597  
 RESULTS OF TWO YEARS (1973-1974) OF ACTIVITIES AT TELETRA  
 IN THE FIELD OF THIN-FILM INTEGRATED CIRCUITS  
 MODENA, G.  
 ALTA FREQ.  
 Codice: ALFRAJ (ITALY) VOL.44, NO.7 383-90 JULY 1975  
 A GENERAL PICTURE OF THE TELETRA RESULTS ON THIN FILM  
 INTEGRATED CIRCUITS IN THE PERIOD 1973-74 IS GIVEN. CERTAIN  
 PLANT, MACHINES, AND SPECIALIZED EQUIPMENT USED IN THIN-FILM  
 INTEGRATED CIRCUIT AND CERTAIN TYPES OF HYBRID CIRCUIT  
 MANUFACTURE ARE ILLUSTRATED.  
 Descriptors: THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS;

INTEGRATED CIRCUIT PRODUCTION  
 Identifiers: THIN FILM IC; HYBRID IC; IC PRODUCTION  
 02  
 Section Class Codes: B2524, B2540  
 Unified Class Codes: SMCEAH, SNEAB  
 Language: ITALIAN

B17710 B7537596  
 MICROLELECTRONICS AND PRINTED WIRING BOARDS  
 MICROLELECTRONICS AND PRINTED WIRING BOARDS  
 SHAROTTE, G.  
 Report No.: D1-S-1800; Issued by: IBM FEDERAL SYSTEMS  
 DIV., HUNTSVILLE, ALA., USA;  
 June 1974  
 POTENTIAL APPLICATIONS FOR HYBRID MICROELECTRONICS IN ARMY  
 MISSILES WERE EVALUATED AND SAMPLE HARDWARE DESIGNED.  
 PRIOR DEMONSTRATION VEHICLE WAS THE THAD SIX INCH MISSILE  
 AUTOPilot. THE SPECIFIC OBJECTIVES WERE TO DESIGN, FABRICATE  
 AND EVALUATE HYBRID MODULES TO PERFORM THE CIRCUIT FUNCTIONS  
 OF THE EXISTING DISCRETE DESIGN, AND TO EOLVE A MULTILAYER  
 PRINTED WIRING BOARD AND THIRD LEVEL PACKAGE TO THE POINT THAT  
 THE OVERALL IMPACT OF THE HYBRID MICROELECTRONICS PACKAGING  
 APPROACH COULD BE COMPARED WITH THE DISCRETE DESIGN AT THE  
 AUTOPilot SUBASSSEMBLY LEVEL.

Descriptors: MISSILES; HYBRID INTEGRATED CIRCUITS; PRINTED  
 CIRCUITS; PACKAGING; THICK FILM CIRCUITS; MULTILAYER PRINTED  
 WIRING BOARD; HYBRID MICROELECTRONICS; PACKAGING; MISSILES

11  
 Section Class Codes: B2522, B2540, B2210  
 Unified Class Codes: SMCCAX, SNEAW  
 Availability: NTIS, SPRINGFIELD, VA. 22161. USA

SUCCESSIVE METAL LAYERS ARE PARTIALLY EVAPORATED BY LASER  
 BEAM AND A STREAM OF ABRASIVE PARTICLES IS APPLIED TO CLEAN  
 THE EXPOSED SUBSTRATE AND TO ERODE PART OF THE OUTER LAYER.  
 WHICH IS SELECTIVELY DISSOLVED BY ETCHING  
 Descriptors: INTEGRATED CIRCUIT PRODUCTION; THICK FILM  
 CIRCUITS; EVAPORATION; ABRASION; LASER BEAM MACHINING;  
 Identifiers: METAL LAYERS; PARTIALLY EVAPORATED; LASER BEAM;  
 ABRASIVE PARTICLES; ETCHING; IC PRODUCTION  
 08  
 Section Class Codes: B2522, B2100  
 Unified Class Codes: SMCCAX, EGMAAA

B17707 B7537593  
 GLASS LAYERS AS PROTECTION, ESPECIALLY FOR RESISTIVE  
 ELEMENTS IN THICK FILM TECHNOLOGY  
 SZLABA, O.; LUSIAK-WOJCICKA, D.  
 PR. PRZEM. INST. ELEKTRON. (POLAND)  
 1974. Codice: PPIAL  
 DISCUSSES GLASS LAYERS AS DIRECT PROTECTION OF RESISTIVE  
 ELEMENTS AND CAPACITIVE THICK FILM CIRCUITS AGAINST  
 ATMOSPHERIC CONDITIONS AND MECHANICAL DAMAGES. GIVES A LIST OF  
 GLASS TYPES FOR THIS APPLICATION, REQUIREMENTS THEY SHOULD  
 MEET, AND METHODS OF PROTECTIVE PASTE PREPARATION (112 refs.)  
 Descriptors: THICK FILM CIRCUITS; GLASS, PROTECTIVE COATINGS  
 Identifiers: RESISTIVE ELEMENTS; CAPACITIVE THICK FILM  
 CIRCUITS; ATMOSPHERIC CONDITIONS; MECHANICAL DAMAGES;  
 PROTECTIVE PASTE PREPARATION; GLASS LAYER; PROTECTIVE COATINGS  
 02  
 Section Class Codes: B2522, B2210  
 Unified Class Codes: SMCCAX, SEEAS  
 Language: POLISH

B17706 B7537504  
 METHODS FOR MAKING ELECTRONIC CIRCUITS  
 MAGGS, C.; WEICK, W.  
 Patent No.: USA 3867217 Assignee: BELL TELEPHONE LABS.  
 INC. Filed: 29 OCT. 1973  
 10 FEB. 1975

**817705 B7537591**  
**SCREEN PRINTING AND SCREEN TENSIONING EQUIPMENT FOR THICK**  
**FLU. CIRCUITS**  
**FALUYI, E.**  
**FIDOTEC, AND MIKROTECH, (HUNGARY)** VOL.14, NO.6 182-5  
**JUNE 1975** Coden: F914  
 Describes an equipment based on the 'off-print' principle. The operation is semi-automatic. Feeding and removal of substrate plates is manual. The knife is oil hydraulically driven, with a wide range of velocities (3-10 cm/s) and can be operated in single strokes, of automatic cycles with rate of 400 to 1000/hour. Accuracy necessary for repeated printing is ensured by a micrometer adjustment. An important auxiliary apparatus for the preparation is the screen tensioning apparatus employing pneumatic cylinders equipped with ratio clamps (4 refs).  
 Directors: THICK FILM CIRCUITS: INTEGRATED CIRCUIT PRODUCTION; PRINTING; MICRODENTER; ADJUSTMENT; SCREEN PRINTING; SCREEN TENSIONING EQUIPMENT; INTEGRATED CIRCUIT MANUFACTURE; OFF PRINT; SEMIAUTOMATIC OPERATION  
 02  
 Section Class Codes: B2522  
 Unfilled Class Codes: SMCCAX  
 Language: HUNGARIAN

**INSUL./CIRCUITS (USA)** VOL.21, NO.8 29-32 JULY 1975  
 Coden: FSC02  
 Discusses the use of polymer thick film technology to fabricate resistors, conductors and dielectrics directly on PCBs to reduce costs. Substrate materials include standard PCB materials. The sheet resistivities are available between 10 ohms and 1 M ohm per square. Two screen printable conductors, one for edge connectors and one for high conductivity and good solderability are discussed. The advantages, characteristics and applications are considered.  
 Directors: PRINTED CIRCUITS: THICK FILM CIRCUITS; THICK FILM RESISTORS  
 Inventors: POLYMER THICK FILM; SCREEN PRINTING; EDGE CONNECTORS; THICK FILM RESISTORS; THICK FILM CONDUCTORS; PRINTING ON PCB; INSULATING FILMS; 10 TO 1 M OHM PER SQUARE; HIGH CONDUCTIVITY CONDUCTORS  
 02  
 Section Class Codes: B2230, B2522, B2210  
 Unfilled Class Codes: SEMAWA, SMCCAX, SEEAS

**817322 B7537168**  
**FILTER NETWORK WITH CHIP CAPACITOR AND FILM RESISTOR**  
 Patent No.: UK 134954 Assignees: STC LTD Filed: 16 MARCH 1972  
 26 FEB. 1975  
 A chip capacitor has at least one film resistor deposited integrally on a face, the value of the (or each) resistor having been altered by removal of some of the film material. The alteration may be by erosion by a laser beam leaving tracks. The resistor may be a thin film NiCr resistor with thin film Au connections overlapping end conductors and adjacent edges of the resistor, an advantage of using a thin film resistor is that the deposition temperature is below the value which would harm capacitors. A close tolerance low-power RC filter with high stability (1 percent over 10 years) and low temperature coefficient of RC product (50 ppm/degree C)  
 Directors: PASSIVE FILTERS; THIN FILM CIRCUITS; CAPACITORS  
 Inventors: CHIP CAPACITOR; FILM RESISTOR; DEPOSITION TEMPERATURE; STABILITY; TEMPERATURE COEFFICIENT; RC FILTER  
 02  
 Section Class Codes: B1000, B2524, B2540  
 Unfilled Class Codes: ET40A, SMCCAX

**817391 B7537255**  
**LOW FIRING POLYMER THICK FILM ENABLES THE SCREEN PRINTING OF**  
**RESISTORS AND CONDUCTORS ON PC BOARDS**  
**MARIN, F.W.**  
**MICRO DEV. CO., CHICAGO, IL, USA**

806423 B7534249  
STANDARDIZABLE LOW-PASS VOICE-BAND HYBRID CIRCUIT FILTERS  
FOR PULSE CODE MODULATION (PCM) COMMUNICATION SYSTEMS  
MICHAEL, W.B.; MESS, L.K.  
TRANSMISSION NETWORK DEV. DEPT., BELL-NORTHERN RES., OTTAWA,  
ONTARIO, CANADA

IEEE J. SOLID-STATE CIRCUITS (USA) VOL. SC-10, NO. 4

229-35 AUG. 1975 Content: 155CBC  
A STANDARDIZABLE DESIGN APPROACH TO REALIZE THE VOICE BAND LOW PASS FILTERS FOR A VARIETY OF PULSE CODE MODULATION (PCM) COMMUNICATION SYSTEMS IS DESCRIBED. THIS DESIGN CONCEPT INCORPORATES CASCADED RC ACTIVE FILTER SECTIONS, THICK AND THIN FILM HYBRID TECHNOLOGIES, AND FUNCTIONAL TUNING TO ALLOW THE USE OF THE SAME HYBRID DESIGN FOR BOTH TRANSMIT AND RECEIVE FILTERS. FOR A RANGE OF INPUT AND OUTPUT REQUIREMENTS, TUNING, SENSITIVITY ANALYSES, AND IMPLEMENTATION TRADEOFFS ARE DESCRIBED. THICK FILM IMPLEMENTATIONS, USING NPO CHIP CAPACITORS, WITH THE NEW HIGH STABILITY RESISTOR INKS AS WELL AS THIN FILM IMPLEMENTATION, USING THE USUAL TANTALUM INTEGRATED THIN FILM TECHNOLOGY, ARE PRESENTED. VERY STRINGENT REQUIREMENTS HAVE BEEN SUCCESSFULLY MET USING STATE-OF-THE-ART HYBRID TECHNOLOGIES. (12 Refs.)  
Designers: PULSE-CODE MODULATION LINKS: ACTIVE FILTERS; HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS; THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS; THICK FILM CIRCUITS; LOW PASS VOICE BAND ACTIVE FILTERS; AC FILTERS; PCM LINKS; FUNCTIONAL TUNING; SENSITIVITY ANALYSES; IMPLEMENTATION TRADEOFFS; HIGH STABILITY RESISTOR INKS; NPO CHIP CAPACITORS; TANTALUM INTEGRATED THIN FILM TECHNOLOGY

02  
Section Class Codes: B25560, B2540, B1600, B2532, B2524  
Unified Class Codes: F6KAA, SMEAB, ETRAW, SMCCAX, SMEAH

STABILIZATION; COMPACT CIRCULATOR; BROAD BAND CIRCULATOR;  
LUMPED ELEMENT CIRCULATOR; JUNCTION EIGENINDUCTANCES  
02  
Section Class Codes: B3290, B524  
Unified Class Codes: ENMAAW, SMEAH

B05560 B7533254  
LOW TEMPERATURE PROCESSING IN HYBRID MANUFACTURING INCREASES  
SURVIVAL RATE  
GILLIS, T. B.  
MICROWAVE AND POWER TUBE DIV., RAYTHEON CO., QUINCY, MA, USA  
INSUL./CIRCUITS (USA) VOL. 21, NO. 6 19-22 JUNE 1975  
Coden: ISUBE  
Discusses thick-film, high reliability multichip hybrid IC  
manufacture using the chip and wire assembly. Assembly  
techniques to increase the semiconductor chip survival rate by  
limiting the chip temperature exposure to below 150°C are  
described. Epoxy die attach, ultrasonic wire bonding, and  
package seal welding are covered and measurement results shown  
(1 Refs.)  
Designers: HYBRID INTEGRATED CIRCUITS; INTEGRATED CIRCUIT  
PRODUCTION; THICK FILM CIRCUITS; ASSEMBLING  
Identifiers: IC MANUFACTURE; PACKAGE SEAM WELDING; MULTICHIP  
ICs; HYBRID ICs; IC MANUFACTURE; LOW TEMPERATURE PROCESSING;  
YIELD IMPROVEMENT; US WIRE BONDING; EPOXY DIE ATTACH; ASSEMBLY  
TECHNIQUES  
02  
Section Class Codes: B2564, B2540, B2522  
Unified Class Codes: SMEAN, SMEAA, SMCCAX

B05557 B7533251  
HYBRID MICROCIRCUIT DESIGN GUIDE  
Report No.: SLA-74-0333; Issued by: SANDIA LABS.,  
ALBUQUERQUE, N.MEX., USA;  
JULY 1974  
A DESIGN GUIDE FOR THIN-FILM HYBRID MICROCIRCUIT TECHNOLOGY  
IS PROVIDED. GUIDELINES AND CONSTRAINTS FOR LAYING OUT A  
HYBRID CIRCUIT ARE DEVELOPED. THE AVAILABILITY OF MODEL HYBRID  
MICROCIRCUITS FROM A PROTOTYPE FACILITY IS REPORTED  
Designers: HYBRID INTEGRATED CIRCUITS; DESIGN AIDS;  
INTEGRATED CIRCUIT PRODUCTION; ENGINEERING FACILITIES;  
SEMICONDUCTOR DEVICE MODELS; THIN FILM CIRCUITS  
Identifiers: DESIGN GUIDE; MICROCIRCUITS; PROTOTYPE FACILITY; THIN FILM HYBRID IC  
11  
Section Class Codes: B2540, B2524, B1269  
Unified Class Codes: SMEAB, SMEAH, ADGAE  
Availability: NTS, SPRINGFIELD, VA, 22161, USA

006017 B7532044  
TEMPERATURE-STABILIZED 1.7-GHz BROAD-BAND LUMPED-ELEMENT  
CIRCUIT  
KATOH, H.  
CHIBA, JAPAN  
LANS., NIPPON ELECTRIC CO. LTD., NAKAHARA-KU,  
KAWASAKI, JAPAN  
IEE TRANS. MICROWAVE THEORY AND TECH. (USA) VOL. MTT-23,  
NO. 11, APR-16, AUG. 1975 Content: 155AR  
A MMW CONSTRUCTION TECHNIQUE FOR BROAD-BANDING AND  
TEMPERATURE STABILIZATION OF A LUMPED-ELEMENT CIRCULATOR IS  
PRESENTED TO OBTAIN A COMPACT CIRCULATOR FOR PRACTICAL USAGE.  
BY USING A NEW INTEGRATED WIDE-BANDING NETWORK CONSISTING OF  
THREE SERIES RESONANT CIRCUITS ON THE BACK OF THE JUNCTION  
SUBSTRATE, 1.7-GHz DOUBLE-TUNED AND TRIPLE-TUNED BROAD-BAND  
CIRCULATORS HAVE BEEN SUCCESSFULLY DEVELOPED. A DESIGN THEORY  
FOR TEMPERATURE COMPENSATION OF A LUMPED-ELEMENT CIRCULATOR IS  
ALSO PRESENTED. (15 Refs.)  
Designers: CIRCULATORS (MICROWAVE); THIN FILM CIRCUITS  
MICROWAVE; INTEGRATED CIRCUITS; THIN FILM CIRCUITS  
15

805556 8753250  
COMBINATION OF SPECIFICATIONS DESCRIBING HYBRID MICROCIRCUIT

TECHNOLOGY

TAPP, C.M.; SHARP, D.J.

Report No.:

SLA-74-0300;

Issued by:

SANDIA LABS.,

ALBUQUERQUE, N.MEX., USA;

Contract No.:

AT(79-1789

JULY 1974

THE SPECIFICATIONS ARE DIVIDED INTO TWO CATEGORIES OF DRAWING NUMBERS. ONE APPLIES TO SPECIAL ISSUE SPECIFICATIONS IN FABRICATING HYBRIDS. THE OTHER DESCRIBES THE MATERIALS USED IN THE HYBRID PROCESS. THE QUALITY CONTROL ASPECTS OF HYBRID MICROCIRCUIT PRODUCTION ARE EXPLAINED.

DESCRIPTIONS: HYBRID INTEGRATED CIRCUITS; PROJECT ENGINEERING; INTEGRATED CIRCUIT PRODUCTION; QUALITY CONTROL; MATERIALS; INVENTORY; SPECIFICATIONS; DRAWING NUMBERS; MATERIALS; QUALITY CONTROL; HYBRID MICROCIRCUIT PRODUCTION

11

Section Class Codes: B2540, B1261

Unified Class Codes: SMEAAB, ADGAA

Availability: NTIS, SPRINGFIELD, VA, 22161, USA

Section Class Codes: B2540, B1261

Unified Class Codes: SMEAAB, SMCCAX

805553 8753247  
THICK FILM/FLIP CHIP-A SYSTEMS APPROACH

EINH, R.C.

MINI-C. RADIO PRODUCTS DEPT., GENERAL ELECTRIC CO.,

LYNCHBURG, VA, USA

TELE. TRANS. MANUF. TECHNOL. (USA)

VOL. MFT-4, NO. 1

2-8

SEPT. 1975

Cordone, Emeric

TECHNICIAN

THICK-FILM HYBRID INTEGRATED CIRCUIT PROCESS CURRENTLY BEING USED TO REALIZE COMPLEX CIRCUIT FUNCTIONS IN HYBRID FORM IS DISCUSSED. THE THICK-FILM TECHNOLOGY, ACTIVE DEVICE ATTACHMENT, AND PACKAGING ALL PLAY IMPORTANT ROLES IN THE OVERALL SYSTEMS APPROACH. A DISCUSSION OF THE VARIOUS PROCESSSES WILL BE PRESENTED, STARTING WITH THE CERAMIC SUBSTRATE AND ENDING WITH THE COMPLETED PACKAGE. EXTENSIVE USE IS MADE OF COMPUTER-CONTROLLED LAYER THICKENING FOR BOTH STATIC TRAPPING OF RESISTORS, AND FUNCTIONAL TRAPPING OF TRANSISTORS. ASSUMING PROBABLY 1000, THE LASER IS A USEFUL TOOL.

ACTIVE DEVICES ARE ATTACHED USING A SOLDER-BEFLON TECHNIQUE.

ALL OF THE CONNECTIONS ON THE ACTIVE DEVICES ARE TERMINATED USING SOLDER ROUNDS CONSISTING OF A TIN/LEAD ALLOY. THERE ARE COMM. SPOILING LAND AREAS ON THE CERAMIC SUBSTRATE THAT HAVE BEEN COATED WITH A TIN/LEAD SOLDER. THE LAND AREAS ON THE SUBSTRATE ARE DESIGNED IN SUCH A WAY AS TO RESTRICT THE SOLDER MELTING TO THE SMALL AREA AROUND THE TERMINAL SIMILAR TO THE TIN, 'CONTROLLED COLLAPSE' PROCESS. THE TECHNIQUES EMPLOYED RESULT IN THICK-FILM HYBRID INTEGRATED CIRCUITS THAT ARE ECOLOGICAL, RELIABLE, HIGH IN YIELD, AND OFFER CONSIDERABLE FLEXIBILITY TO THE HYBRID MANUFACTURE (110 ROI).

DESCRIPTIONS: HYBRID INTEGRATED CIRCUITS; THICK FILM

INTERCONNECTION TECHNIQUES; PACKAGE SEALING

02

Section Class Codes: B2540, B2522

Unified Class Codes: SMEAAB, SMCCAX

THICK FILM HYBRID INTEGRATED CIRCUITS; COMPUTER CONTROLLED LASER TRIMMING; SOLDERING; FLIP CHIPS; MANUFACTURE

02

Section Class Codes: B2540, B2522

Unified Class Codes: SMEAAB, SMCCAX

EASING PROBLEMS WITH HYBRIDS  
BURKITT, A.  
ELECTRON. ENGINEERING (GB)

1975

Coden: ECEA9

1975

Editor: ECEA9

1975

Vol. 47,

NO. 567

60-1

MAY

IT IS NOW GENERALLY ACCEPTED THAT THE COST OF HYBRIDS IS GREATER THAN THE TOTAL COST OF THE DISCRETE COMPONENTS THAT MAKE UP AN EQUIVALENT CIRCUIT ON A P.C.B. HOWEVER, WHEN THE COST OF PUTTING THESE COMPONENTS TOGETHER IS ADDED IN, HYBRIDS ARE AT LEAST WHEN PRODUCED IN LARGE QUANTITIES ARE ECONOMIC.

DESCRIPTIONS: HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS; THICK FILM CIRCUITS; PACKAGING; RELIABILITY; DISCRETE CIRCUITS; INTEGRATED CIRCUITS

02

Section Class Codes: B2540, B2522, B2524

Unified Class Codes: SMEAAB, SMCCAX, SMEAAB

805549 8753243  
EASING PROBLEMS WITH HYBRIDS

BURKITT, A.

ELECTRON. ENGINEERING (GB)

1975

Coden: ECEA9

1975

Vol. 47,

NO. 567

60-1

MAY

DESCRIPTIONS: HYBRID INTEGRATED CIRCUITS; COMPUTER CONTROLLED LASER TRIMMING; SOLDERING; FLIP CHIPS; MANUFACTURE

02

Section Class Codes: B2540, B2522, B2524

Unified Class Codes: SMEAAB, SMCCAX, SMEAAB

805548 8753242  
FORECAST OF 1980 HYBRID ISSUES

CIRCUITS, MANUF. (USA)

VOL. 15,

NO. 3

52-4

MARCH 1975

Coden: CEGAF

1975

Editor: ECEA9

1975

Vol. 15,

NO. 3

52-4

MARCH 1975

DISCUSSES HYBRID INTEGRATED CIRCUITS; MANUFACTURE; FUTURE COST OF MATERIALS AND REQUIREMENTS OF ENGINEERS. A SURVEY OF HYBRID TECHNOLOGISTS IS DISCUSSED COVERING THE AREAS: THICK FILM MATERIALS, DEVICE INTERCONNECTION TECHNIQUES, DEVICE PACKAGE TECHNOLOGIES, PACKAGE SEALING TECHNIQUES, DEVICE PACKAGE MATERIALS, DEVICE INTERCONNECTION TECHNIQUES, DEVICE PACKAGE TECHNOLOGIES, HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS; PRODUCTION; FORECASTING; TECHNOLOGICAL FORECASTING; PRODUCTION; SURVEY; PACKAGING; TECHNOLOGICAL FORECASTING; HYBRID INTEGRATED CIRCUIT; THICK FILM MATERIALS; DEVICE INTERCONNECTION TECHNIQUES; PACKAGE SEALING

02

Section Class Codes: B2540, B2522

Unified Class Codes: SMEAAB, SMCCAX

DISCUSSIONS: HYBRID INTEGRATED CIRCUITS; MANUFACTURE; FUTURE COST OF MATERIALS AND REQUIREMENTS OF ENGINEERS. A SURVEY OF HYBRID TECHNOLOGISTS IS DISCUSSED COVERING THE AREAS: THICK FILM MATERIALS, DEVICE INTERCONNECTION TECHNIQUES, DEVICE PACKAGE TECHNOLOGIES, DEVICE PACKAGE MATERIALS, DEVICE INTERCONNECTION TECHNIQUES, DEVICE PACKAGE TECHNOLOGIES, HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS; PRODUCTION; FORECASTING; TECHNOLOGICAL FORECASTING; PRODUCTION; SURVEY; PACKAGING; TECHNOLOGICAL FORECASTING; HYBRID INTEGRATED CIRCUIT; THICK FILM MATERIALS; DEVICE INTERCONNECTION TECHNIQUES; PACKAGE SEALING

02

Section Class Codes: B2540, B2522

Unified Class Codes: SMEAAB, SMCCAX

805511 07533190  
**A NEW RESISTIVE MATERIAL FOR HIGH STABILITY RC NETWORKS.**  
 APPLICATION TO THE PRODUCTION OF ACTIVE FILTERS  
 MOULIN, M.  
 LIT. CONFLANS-SAINTE-HONORINE, FRANCE  
 COLLOQUE INTERNATIONAL SUR LES MATERIAUX POUR LES COMPOSANTS  
 ELECTRONIQUES (INTERNATIONAL SYMPOSIUM ON MATERIALS FOR  
 ELECTRONIC COMPONENTS) 251-7, 1975  
 2-4 APRIL 1975, PARIS, FRANCE  
 C.I.M., D'ORGANISATION DU COLLOQUE DE PARIS, PARIS, FRANCE  
 THE TECHNIQUES USED CONSISTS OF INTEGRATING ON THE  
 SAMI SUBSTRATE, ANODISED TANTALUM THIN FILM CAPACITORS TEMP.  
 COEFFICIENT APPROXIMATELY +200 ppm/DEGREESCH. AND THIN FILM  
 RESISTORS, WITH A TEMPERATURE COEFFICIENT APPROXIMATELY -200  
 ppm/DEGREESCH. A SUMMARY OF THE DEVELOPMENT OF A SUITABLE NEW  
 RESISTIVE MATERIAL FOR MICROELECTRONIC APPLICATIONS IS GIVEN.  
 THE DIFFERENT STEPS REVIEWED ARE: PREPARATION OF THIN LAYS,  
 INFLUENCE OF THE CATHODIC SPUTTERING PARAMETERS, COMPARISON  
 BETWEEN THE CHARACTERISTICS OF THE FILMS OBTAINED IN DIFFERENT  
 SPUTTERING ATMOSPHERES, COMPARISON OF THE STABILITY OF  
 SPUTTERED TA, OXY-NITRIDED TA AND AL-TA ALLOY FILMS  
 DISCRIMINATORS; ACTIVE FILTERS; THIN FILM RESISTORS; SPUTTERING  
 THIN FILM CIRCUITS  
 1. Identifiers: INTEGRATED CIRCUIT APPLICATION: THIN FILM;  
 PREPARATION: NITRIDED TA FILMS; OYNITRIDED TA FILMS;  
 RESISTIVE MATERIAL: HIGH STABILITY RC NETWORKS; ACTIVE FILTERS;  
 THIN FILM RESISTORS; TEMPERATURE COEFFICIENT: CATHODIC;  
 SPUTTERING PARAMETERS; CHARACTERISTICS; SPUTTERING ATMOSPHERES  
 : AL-TA ALLOY FILMS  
 06  
 Section Class Codes: B2524, B1880  
 Unfilled Class Codes: SMCEAH, ETRAM  
 Language: FRENCH

805509 07533168  
**SIO CAPACITORS FOR HIGH FREQUENCY THIN FILM CIRCUITS**  
 MAYER, G.; HOSKA, K.H.  
 SIEMENS AG, MUNCHEN, GERMANY  
 NACHRICHTENTECH. Z. (INTZ) (GERMANY) VOL.25, NO.6 207-11  
 JUNE 1975 Coden: HA72A  
 THE STRUCTURE OF SIO CAPACITORS IS DESCRIBED. THEY ARE MADE  
 TO BE SELFHEALING. THEREFORE THE YIELD IN PRODUCTION IS  
 PRACTICALLY 100PERCENT. THE DIELECTRIC PROPERTIES ARE GIVEN.  
 WITH AN ADJUSTMENT METHOD BY TESLA DISCHARGE IT IS POSSIBLE TO  
 TRIM THESE CAPACITORS TO AN ACCURACY OF +OR- 0.1PERCENT OR  
 0.05PF. THE STABILITY IS EXCELLENT, E.G. IN A LONG TER TEST  
 AT 150 DEGREESCH. THE MEAN CAPACITANCE DEVIATION AFTER 2000 H  
 AMOUNTED TO -0.04PERCENT. THIN FILM SIO CAPACITORS MAY BE  
 INTEGRATED EITHER WITH CR41- OR TA/SUB 2/N RESISTOR NETWORKS.  
 THEIR PROPERTIES IN DIFFERENT ARRANGEMENTS WITH 1A/SUB 2/N  
 REGISTERS ARE DISCUSSED. AN EXAMPLE OF APPLICATION-THE  
 NEGATIVE FEEDBACK NETWORK OF THE REPEATER OF THE 60 MHZ  
 CARRIER FREQUENCY SYSTEM-SHOS, THAT SIO CAPACITORS FULFIL  
 HIGH PERFORMANCE [7 refs].  
 Describers: THIN FILM CIRCUITS; THIN FILM CAPACITORS;  
 Identifiers: SIO CAPACITORS; HIGH FREQUENCY THIN FILM  
 CIRCUITS; CR41; TA/SUB 2/N RESISTOR NETWORKS; NEGATIVE  
 FEEDBACK NETWORK; REPEATER; 60 MHZ CARRIER FREQUENCY SYSTEM  
 02  
 Section Class Codes: B2524, B2670  
 Unfilled Class Codes: SMCEAH, SMRAAR

805509 07533107  
**FABRICATION OF THIN FILM RESISTORS AND RESISTOR NETWORKS BY  
 A SELECTIVE ETCHING PROCESS**  
 BABA, S.C.; RUMHALA, D.P.; MARATHA, B.R.  
 CENTRAL ELECTRONICS ENG. RES. INST., PILANI, INDIA  
 J. INST. ELECTRON. AND TELECOMMUN. ENG. (INDIA) VOL.20,  
 NO.12 602-6 DEC. 1974 Coden: JETAU  
 RESULTS ON THE SELECTIVE ETCHING OF A TWO LAYER SYSTEM  
 (RESISTIVE LAYER AND CONDUCTIVE LAYER) ON GLASS SUBSTRATES TO  
 ACHIEVE RESISTORS/RESISTOR-NETWORKS ARE DESCRIBED. THE METHOD  
 RESULTS IN GOOD RESOLUTION OF THIN FILM PATTERNS, SMALLER AREA  
 FLEXIBILITY, HIGHER YIELD AND LOWER COST THAN WITH THE  
 PREVIOUSLY USED METHODS. (2 Refs.)

805510 07533189, C7520003  
**READ ONLY MEMORY WITH ANNULAR FUSE LINKS**  
 TAYLOR, W.K.  
 Patient No.: USA 3063231 Assignees: NRD  
 Filed: 23 JULY  
 1971  
 21 JAN. 1975  
 APPLICATION OF A VOLTAGE OF A PREDETERMINED MAGNITUDE  
 BETWEEN TWO CONDUCTORS CAUSES FUSING OF THE CORRESPONDING LINK  
 OVER AN ANNULAR AREA OF FILM SURROUNDING THE FIRST CONDUCTOR  
 BUT APPLICATION OF A VOLTAGE OF HALF THIS MAGNITUDE DOES NOT  
 CAUSE FUSING.  
 Describers: READ-ONLY STORAGE; THIN FILM RESISTORS; THIN  
 FILM CIRCUITS  
 Identifiers: READ ONLY MEMORY; THIN FILM ANNULAR FUSE LINKS  
 09  
 Section Class Codes: B2524, C0590, B2210  
 Unfilled Class Codes: SMCEAH, SEEAS

Section Class Codes: B2524, B2210  
 Unfilled Class Codes: SMCEAH, SEEAS

805503 B7531185 RECENT ADVANCES IN PLATINUM-SILVER THICK-FILM CONDUCTORS STEIN, S.J.; HUANG, C.; CANG, L.; SCHULZ, G. ELECTRO-SCIENCE LABS, INC., PENNSAUKEN, N.J., USA SOLID STATE TECHNOL. (USA), VOL.18, NO.5 25-33 MAY 1975 (Editor: SSTEAP) A NUMBER OF NEW DEVELOPMENTS IN PLATINUM-SILVER CONDUCTOR MATERIALS AND THEIR PHYSICAL AND ELECTRICAL PROPERTIES ARE PRESENTED. THE ADVANTAGES AND DISADVANTAGES, AS RELATED TO PERFORMANCE AND COST, OF VARIOUS CONDUCTOR COMPOSITIONS ARE DISCUSSED. A GROUP OF FRITLESS PI-AG COMPOSITIONS INCLUDING ONE OF PURE AG ARE STUDIED AND THEIR ADHESION, ADHESION AFTER STORING AT 150 DEGREES C, CONDUCTIVITY, SOLIDARITY, SOLDER LEAD, RESISTANCE AND OTHER PROPERTIES, ARE REPORTED. ANOTHER GROUP OF PI-AG COMPOSITIONS CONTAINING GLASS AS A RIDGE IS ALSO REPORTED. THESE DATA ARE PRESENTED IN TERMS OF INCREASING PLATINUM CONTENT. THE COMPATIBILITIES AND GEOMETRY EFFECTS OF THE COMPOSITIONS WITH VARIOUS RESISTOR TYPES ARE PRESENTED. THE RESULTS OF SILVER MIGRATION STUDIES ILLUSTRATE ONE OF THE POTENTIAL PROBLEMS WHICH MUST BE CONSIDERED IN USING CONDUCTORS OF HIGH SILVER CONTENT. SUGGESTIONS FOR DESIGNING CIRCUIT LAYOUTS AND MINIMIZING MIGRATION DIFFICULTIES ARE GIVEN. (19 Refs.)

Descriptors: THICK FILM CIRCUITS; CONDUCTORS (ELECTRIC); REVIEWS; PI-AG; THICK FILM CONDUCTORS; ADHESION; SOLIDARITY; SOLDER LEAD RESISTANCE; GLASS; CIRCUIT LAYOUTS; (Editor: LMCAS) 02 Section Class Codes: B2522 Unified Class Codes: SMCCAK

15 MAY 1975 (Editor: LMCAS) A GENERAL DISCUSSION OF NEW DEVELOPMENTS IS ILLUSTRATED BY A DESCRIPTION OF A THICK FILM AMPLIFIER WITH DISTRIBUTED CONSTANT COMPONENTS FOR THE L-BAND. THE COMPONENTS HAD BEEN SEPARATELY STUDIED AT FREQUENCIES UP TO 12 GHZ. (Editor: LMCAS) 02 Section Class Codes: B2522, B1640, B1620 Unified Class Codes: SMCCAK, ETHAAB, ETEAAD Language: FRENCH

805503 B7531182 THICK FILM CIRCUITS TECHNOLOGY COMETTA, M. ELETTRIFICAZIONE (ITALY) NO.5 236-40 MAY 1975 (Editor: ELITAL) AFTER BRIEF REVIEW OF INTEGRATED CIRCUIT TECHNOLOGY QUOTING COMPARISON TABLES OF BASIC CHARACTERISTICS, APPLICATIONS, COSTS, ETC., THE AUTHOR CONCENTRATES ON THICK FILM TECHNOLOGY. TECHNICAL MATERIALS AND SUBSTITUTES USED IN PRODUCTION ARE DISCUSSED. QUOTING MAIN ADVANTAGES AND USAGE, DESIGN CONSIDERATIONS AND STAMPING METHODS. (Editor: COMETTA) 02 Identifiers: SUBSTRATES; PRODUCTION: THICK FILM TECHNOLOGY; MATERIALS; INTEGRATED CIRCUIT; THICK FILM TECHNOLOGY; PRODUCTION: STAMPING METHODS

805514 B7532733 ACTIVE RC FILTER MADE IN THICK FILM TECHNIQUE MIJAJOVIC, M. TECNIKA (YUGOSLAVIA) VOL.30, NO.3 572-5 1975 (Editor: TECNIKA) ELMO-IPK LABORATORY HAS DEVELOPED THE ACTIVE RC FILTER USING THICK FILM TECHNIQUE WITH THE FOLLOWING FEATURES: PASS-BAND: 0 TO 4.0 MHZ; ATTENUATION IS HIGHER THAN 30 DB/OCTAVE; OPERATING TEMPERATURE RANGE -30OC TO 102OC; SUPPLY VOLTAGE 12 V; DIMENSIONS: 28.14x12 MM (3 Refs.)

Descriptors: ACTIVE FILTERS; THICK FILM CIRCUITS Identifiers: THICK FILM; ACTIVE RC FILTER; SPECIFICATIONS 02 Section Class Codes: B1880, B2522 Unified Class Codes: ETRAAM, SMCCAK Language: CROATIAN

805504 B7531183 THICK LAYER TECHNOLOGY FOR HYPERFREQUENCIES GILOURDOFF, M. CHEZ, LANNION, FRANCE ELECTRON. AND MICROELECTRON. IND. (FRANCE) NO.205 15-17 15 MAY 1975 (Editor: LMCAS) A GENERAL DISCUSSION OF NEW DEVELOPMENTS IS ILLUSTRATED BY A DESCRIPTION OF A THICK FILM AMPLIFIER WITH DISTRIBUTED CONSTANT COMPONENTS FOR THE L-BAND. THE COMPONENTS HAD BEEN SEPARATELY STUDIED AT FREQUENCIES UP TO 12 GHZ. (Editor: LMCAS) 02 Section Class Codes: B2522, B1640, B1620 Unified Class Codes: SMCCAK, ETHAAB, ETEAAD Language: FRENCH

05108 B7532727 FILTER SYNTHESIS USING DISTRIBUTED RESISTANCE-CAPACITY CIRCUITS. II. (FRANCE) VOL.55, NO.6, 347-51 JUNE-JULY 1975. *Content: ONELAS, FIR, PT.1 SEE 1B1D., NO.5.* THIS PART GIVES DETAILED CONSIDERATION TO THE CONSTRUCTIONAL ASPECTS OF THIN CIRCUITS. THE TECHNIQUES INVOLVED IN THE PRODUCTION OF THIN LAYERS ARE CONSIDERED THE SIMPLEST, PRACTICAL APPROACHES ARE DESCRIBED AND TECHNICAL DATA OF ELECTRICAL CHARACTERISTICS AND PHYSICAL DIMENSIONS IS GIVEN. INDUCTANCE, SYNTHESIS AND TRANSFER FUNCTIONS OF CIRCUITS USING UNIFORMLY DISTRIBUTED RC ELEMENTS, ARE SHOWN. THE GEOMETRICAL CONSTRUCTION OF A DISTRIBUTED ELEMENT, SHOWING DIFFERENT DIPOLE ARRANGEMENTS, ARE AND EXAMPLES, SHOWING DIFFERENT DIPOLE ARRANGEMENTS, ARE ILLUSTRATED BY LINE DIAGRAMS. CIRCUIT IMPEDANCE FORMULAE ARE GIVEN, WITH REFERENCES TO A NUMBER OF TRANSFORM THEOREMS. THE METHODS FOLLOWED IN THE SYNTHESIS OF AN IMPEDANCE, OR ADMITTANCE, AND CIRCUITS USING LURID OR DISTRIBUTED ELEMENTS ARE SHOWN. THE GEOMETRICAL CONSTRUCTION OF A DISTRIBUTED ELEMENT, FOR IMPEDANCE SYNTHESIS IS INDICATED. DIMENSIONS: IMPEDANCE; TRANSFER FUNCTIONS: THIN LAYERS: PHYSICAL DIMENSIONS: TRANSFER FUNCTIONS: UNIFORMLY DISTRIBUTED RC ELEMENTS: IMPEDANCE SYNTHESIS: FILTER SYNTHESIS

02  
Section Class Codes: B1680, B2524  
Unified Class Codes: E7AA9, SMCEAH  
Language: FRENCH

04925 B7532509 ON THE PROPAGATION OF VOLTAGE IMPULSES IN THIN FILM DISTRIBUTED PARAMETER NETWORKS THIMM, R. INSTIT. FUR NETZWERK- UND SYSTEMTHEORIE, UNIV. STUTTGART, STUTTGART, GERMANY FREQUENZ (GERMANY) VOL.29, NO.6, 171-7 JUNE 1975  
Code: F721A3  
Description: PULSE AMPLITUDE AND PULSE DURATION DURING THE VARIATIONS OF PULSE AMPLITUDE AND PULSE DURATION DURING THE PROPAGATION OF RECTANGULAR VOLTAGE IMPULSES ARE STUDIED. THE INVESTIGATION IS BASED ON THE CHARACTERISTIC THEORY OF PARTIAL DIFFERENTIAL EQUATIONS. A FEW EXAMPLES SHOW THE EFFECTIVENESS OF THE METHOD (9 Refs).  
Descriptors: DISTRIBUTED PARAMETER NETWORKS: THIN FILM CIRCUITS: PARTIAL DIFFERENTIAL EQUATIONS: PULSE IDENTIFIERS: THIN FILM DISTRIBUTED PARAMETER NETWORKS: PULSE AMPLITUDE: PULSE DURATION: RECTANGULAR VOLTAGE IMPULSES:  
PARTIAL DIFFERENTIAL EQUATIONS  
02  
Section Class Codes: B1650, B2524  
Unified Class Codes: E7AA9, SMCEAH  
Language: GERMAN

793773 B752B85 EVALUATION OF SOLDER BUMP FLIP CHIPS IN THICK FILM SOLDER REFLON MURIDS, D. BROADBENT, D. MOTOTOLA SEMICONDUCTOR PRODUCTS DIV., PHOENIX, AZ, USA INTEGRATED CIRCUITS (USA) VOL.21, NO.5, 33-6 MAY 1975  
Code: F721C  
Description: INCUFE DEVICE ASSEMBLY TECHNIQUES DEVELOPED TO REDUCE DISCUSSIONS, DEVICE ASSEMBLY COSTS, TYPES AND FORMATS OF AVAILABLE LAOUR AND MATERIAL COSTS, AND METHODS OF ATTACHMENT ARE DISCUSSED. FLIP CHIP BONDING BY REFLON SOLDERING, DEVICE AVAILABILITY, RELIABILITY, AND ECONOMIC CONSIDERATIONS ARE DISCUSSED. A TABLE OF ASSEMBLE TECHNIQUES, BEAM LEAD, CHIP AND WIRE, AND FLIP CHIP REFLON IS GIVEN. A TABLE OF COMPARATIVE COSTS IS ALSO SHOWN.  
02  
Description: ASSEMBLING: HYBRID INTEGRATED CIRCUITS SERVICOR CHIP DEVICES AND METHODS OF ATTACHMENT ARE DISCUSSED. FLIP-CHIP DEVICES: SOLDER BUMP FLIP CHIPS: SOLDER REFLOW HYBRIDS: IDENTIFIERS: SOLDER BUMP FLIP CHIPS: RELIABILITY: ECONOMIC CONSIDERATIONS: ASSEMBLY TECHNIQUES: BEAM LEAD, CHIP AND WIRE, AND FLIP CHIP REFLON  
02  
Description: INTEGRATED CIRCUITS: ASSEMBLING: HYBRID INTEGRATED CIRCUITS  
02  
Description: PHOTOLITHOGRAPHY: THIN FILM CIRCUITS  
02  
Description: VAPOR DEPOSITION: PHOTOLITHOGRAPHY: THIN FILM CIRCUITS  
02  
Description: SCHOTTKY DIODES: MANUFACTURING TECHNOLOGY  
02  
Description: SCHOTTKY DIODES: THIN FILM CIRCUITS: BRANCHED PHOTOLITHOGRAPHIC TECHNIQUES: THIN FILM CIRCUITS  
02  
Description: PHOTOLITHOGRAPHIC TECHNIQUES: THIN FILM CIRCUITS: BRANCHED PHOTOLITHOGRAPHIC TECHNIQUES: THIN FILM CIRCUITS  
02  
Description: IC BALANCED MICROWAVE MIXER: VAPOR DEPOSITION  
02  
Section Class Codes: B1660, B2524, B1269  
Unified Class Codes: E7AA9, SMCEAH, ADGMAE  
Language: POLISH

## 793771 B752BBB3

## EFFECT OF SOLDERING FLUX ON TA/SUB 2/N RESISTORS

Report No.: SRA-73-1045; Issued by: SANDIA CORP.,

Contract No.: AT(29-1)-769

April 1974

A STERILE BY SOLDERING RESULTS IN THE PRESENCE OF EXCESS FLUX THAT IS NORMALLY REMOVED WITH ALCOHOL OR TRICHLOROETHYLENE. IN HYBRID MICRO CIRCUITS, SOLVENTS MAY BE RETAINED IN CAVITIES OR Voids. THIS STUDY CONSIDERS THE EFFECT OF FLUX ON TA/SUB 2/N RESISTORS IN HYBRID MICRO CIRCUITS. ASSUMING THAT EXCESS FLUX IS NOT REMOVED BY AVOID USING SOLVENTS, THESE RESISTORS WERE TESTED FOR STABILITY DURING HEATING IN AIR AT 150 DEGREES FOR 200 HOURS. FLUX DOES CAUSE A RESISTANCE VALUE INCREASE AND EXCESS FLUX REMOVAL IS RECOMMENDED.

Descriptor: HYBRID INTEGRATED CIRCUITS; THIN FILM RESISTORS; SOLDERING; TANTALUM COMPOUNDS; INTEGRATED CIRCUIT TESTING; THIN FILM CIRCUITS

Identifiers: TA/SUB 2/N RESISTORS; SOLDERING FLUX; HYBRID

MICRO CIRCUITS; STABILITY; EXCESS FLUX REMOVAL

11

Section Class Codes: B2540, B2210, B2524

Unified Class Codes: SMCAB, SELAB, SMCAB, NTIS, SPRINGFIELD, VA. 22151, USA

Availability: NTIS, SPRINGFIELD, VA. 22151, USA

GREENHOUSE, H. M.; MCGILL, R. L., JR.  
BENDIX CORP., BALTIMORE, MD., USA  
MICROELECTRONICS (GB) VOL. 6, NO. 1 39-50 SEPT. 1974  
Coden: MICEB9  
Deals with the criteria that govern the design of temperature-controlled substrates for hybrid microcircuits. Pertinent thermal parameters for the more important microcircuit fabrication materials are presented in tabular form, along with several useful conversion factors. Substrate heat losses due to conduction, convection and radiation are then analyzed, and equations are developed for determining optimum substrate temperature, steady state input power and warm up characteristics. Control circuit design is discussed, and consideration is given to power dissipation by circuitry off as well as on the substrate. The effects of changes in ambient temperature on temperature-controlled-microcircuit performance are analyzed. Two applications of this technology are described.

Descriptor: TEMPERATURE CONTROL; HYBRID INTEGRATED CIRCUITS

Identifiers:

MICRO CIRCUITS;

THERMAL PARAMETERS; MICRO CIRCUIT FABRICATION;

OPTIMUM SUBSTRATE TEMPERATURE; STEADY STATE INPUT POWER; WARM

UP CHARACTERISTICS; CONTROL CIRCUIT DESIGN; POWER DISSIPATION

02

Section Class Codes: B2540

Unified Class Codes: SMCAB

Availability: NTIS, SPRINGFIELD, VA. 22151, USA

Section Class Codes: SMCAB

Unified Class Codes: SMCAB

Availability: NTIS, SPRINGFIELD, VA. 22151, USA

793769 B752BBB1

## MATERIALS CONTROL FOR THE MANUFACTURE OF THIN-FILM HYBRID

CIRCUITS

CLASS, W.; MURRAY, G. T.

CERAMIC PRODUCTS DIV., MATERIALS RES. CORP., ORANGEBURG,

N.Y., USA

SOLID STATE TECHNOL. (USA) VOL. 18, NO. 5 34-41 MAY 1975

Coden: SSTEAP

THE MANUFACTURE OF A THIN FILM HYBRID CIRCUIT IS A COMPLEX MULTIPLE STEP OPERATION IN WHICH DIFFERENT MATERIALS INTERACT IN A COMPLEX MANNER TO YIELD THE FINAL PRODUCT. THIS ARTICLE DEALS WITH THE VARIETY OF BOTH COATING AND SUBSTRATE MATERIALS USED, THE HAZARDOUS BEHIND THEIR USE, AND THE MANNER IN WHICH THEY ARE BELIEVED TO INTERACT TO YIELD THE FINAL PRODUCT (6 REF.)

Descriptor: HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS;

INTEGRATED CIRCUIT PROCESSING; MATERIALS CONTROL;

HYBRID CIRCUITS; COATING; SUBSTRATE

02

Section Class Codes: B2540, B2524, B1269

Unified Class Codes: SMCAB, SMCAB, AGCMAE

793768 B752BBB0

DESIGN OF TEMPERATURE-CONTROLLED SUBSTRATES FOR HYBRID

MICRO CIRCUITS

793767 B7528879  
 SOME TECHNOLOGICAL PROBLEMS OF HIGH COMPLEXITY THICK FILM HYBRID CIRCUITS  
 BUDKERT, J.; BARANY, M.S.J.  
 HIRAOSTECH, IPIRI KUT, INTÉZ, KÖZL. (HUNGARY) VOL. 15  
 39-14 4 April 1975 Coden: HIKKAB

A SHORT REVIEW OF THE TECHNOLOGICAL COMPATIBILITY OF THE MATERIALS USED IN THE MULTI-LAYER THICK FILM TECHNOLOGY. I.E. THE EFFECTS CAUSING MIGRATION, LEACHING, SWIMMING AND FLOW-IN, IS GIVEN. THE PROBLEMS ARISING IN THE MULTILAYER TECHNOLOGY ARE SOLVED BY EVALUATION OF THE EXPERIMENTS AND BY THAT OF THE CONTROL-SERIES. A MODEL-CIRCUIT HAS BEEN DEVELOPED TO COMPARE THE RESULTS OF THE TYPE-TESTING AND THE ELECTRICAL TESTING OF THE MULTILAYER STRUCTURES RELYING UPON THE MEASURED DATA OF THE CONTROL-SERIES OF THE MODEL CIRCUIT IS GIVEN. THE DATA OBTAINED AND THEIR DEVIATION HAS BEEN EVALUATED BY CONSIDERING THE TYPICAL AND MAXIMUM CATALOGUE-DATA REFERRING TO THE CONDUCTING AND INSULATING PASTES. DATA FOR THE PRACTICAL DESIGN OF MULTILAYER HYBRID CIRCUITS ARE GIVEN (10 Refs.)

Descriptors: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS  
 10 Identifiers: HIGH COMPLEXITY THICK FILM HYBRID CIRCUITS;  
 MIGRATION; LEACHING; SWIMMING; MULTILAYER TECHNOLOGY;  
 ELECTRICAL TESTING; MODEL CIRCUIT  
 02  
 Section Class Codes: B2540, B2222  
 Unified Class Codes: SMEAB, SMCCAX  
 Language: HUNGARIAN

793766 B7528878  
 POWER TRANSISTORS IN THICK FILM CIRCUITS  
 HEATHINGTON, D.  
 NEWCASTLE TRANSISTORS LTD., NEARKET, ENGLAND  
 E147R, ANZ. (GERMANY) VOL. 7, NO. 4 95-6 APRIL 1975  
 Coden: ERIZAG

NO. 4 DEVELOPMENTS IN HYBRID TECHNOLOGY MAKE IT FEASIBLE TO MOBILE POWER TRANSISTOR CHIPS AND IC CHIPS ON A SINGLE CERAMIC SUBSTRATE. THEREBY, THE LARGER PART OF THE AMPLIFIER'S CERAMIC PARTS ALONG WITH THE IC CAN BE CONFINED IN A CONTACT THICKNESS OF SOME MILLIMETERS. THE ARTICLE DESCRIBES SUCH HYBRID AMPLIFIERS FOR OUTPUT POWERS UP TO 50 WATTS.  
 Descriptors: THICK FILM CIRCUITS; POWER TRANSISTORS; HYBRID INTEGRATORS; 50 W; POWER TRANSISTORS; THICK FILM CIRCUITS;  
 HYBRID TECHNOLOGY; SINGLE CERAMIC SUBSTRATE; COMPACT MODULE;  
 02  
 Section Class Codes: B2540, B1840, B2470, B2522  
 Unified Class Codes: SMEAB, ETMAB, SMCCAX  
 Language: GERMAN

793742 B7528840  
 ANTI-COMPROMISE MICROELECTRONIC CIRCUIT  
 BROMER, B.J.; KAPP, E.J.; KEISTER, F.Z.  
 Patent No.: USA 3860835 Assignee: US NAVY Filed: 10 FEB. 1971  
 14 JAN. 1975  
 DISCLOSES A METHOD OF PRODUCING AN ANTI-COMPROMISE THIN FILM CIRCUIT MODULE BY VACUUM DEPOSITION.  
 Descriptors: THIN FILM CIRCUITS; VAPOUR DEPOSITION;  
 INTEGRATED CIRCUIT PRODUCTION; MODULES;  
 Identifiers: ANTI-COMPROMISE THIN FILM CIRCUIT MODULE; VACUUM DEPOSITION  
 02  
 Section Class Codes: B2524  
 Unified Class Codes: SMCEAH

793447 B7528490  
 SUBSTRATE HOLDING DEVICE FOR USE IN SCREEN PRINTING MACHINES  
 GRYL, F.J.  
 TECH. DIG. (USA) NO. 38 15-16 APRIL 1975 Coden: TCHD4V  
 DESCRIBES A HOLDING DEVICE FOR SCREEN PRINTING BILAYER SUBSTRATES AND MULTILAYER CIRCUIT BOARDS, ON ONE SURFACE AND IN THE HOLES, BETWEEN OPPOSITE SURFACES OF A SUBSTRATE. A SPECIAL ADAPTATION OF CONVENTIONAL SCREEN PRINTERS, AND SUITABLE INKING TECHNIQUES TO MAINTAIN ACCURATE POSITIONING BEFORE, DURING, AND AFTER THE INKING OPERATION; DRAW INK THROUGH THE SUBSTRATE HOLE PATTERN EVENLY AND REPLIQUED; AND ACCOMMODATE ANY SUBSTRATE HOLE PATTERN IS DESCRIBED.  
 Descriptors: PRINTED CIRCUITS; THICK FILM CIRCUITS;  
 Metallifiers: INKING IN HOLES; PRINTED CIRCUIT BOARDS; THICK FILM CIRCUITS; SUBSTRATE HOLDING DEVICE; SCREEN PRINTING;  
 BILAYER SUBSTRATES; MULTILAYER CIRCUITS; INKING  
 Techniques  
 02  
 Section Class Codes: B2230, B2522, B1269  
 Unified Class Codes: SEMAAW, SMCCAX, ADGMAE

## 703415 B7528457 NEW APPLICATIONS IN CERMET TECHNOLOGY

SPENCE, G.; HUMPHRIES, R.  
ELECTRON. EQUIP. NEWS (GB) 24 JUNE 1975 Coden: EENAN  
CERMET TECHNOLOGY IS WELL ESTABLISHED IN A VERY WIDE FIELD OF AMPLIFICATION, LOW POWER RESISTORS, NETWORKS AND THICK FILM BASED HYBRID CIRCUITS ARE NOW COMMON PLACE IN AUTOMOTIVE, DOMESTIC AND MILITARY EQUIPMENT. THERE HAS NOT YET BEEN A SIMILAR GROWTH IN THE APPLICATION OF CERMET RESISTORS TO MEET HIGH POWER (5-100 WATTS) REQUIREMENTS AND THE CONVENTIONAL TYPES, SUCH AS WIREWOUND, HAVE BEEN USED. HOWEVER, MOST OF THE FACTORS LIMITING THE USE OF THICK FILM TECHNOLOGIES IN THIS POWER RANGE HAVE BEEN RESOLVED AND SO OPENED THE WAY TO MORE WIDE SPREAD APPLICATIONS OF THIS TECHNOLOGY.  
Descriptors: CERMETS; THICK FILM RESISTORS; THICK FILM CIRCUITS

Identifiers: CERMET TECHNOLOGY; AUTOMOTIVE EQUIPMENT; DOMESTIC EQUIPMENT; RESISTORS; NETWORKS; THICK FILM BASED HYBRID CIRCUITS; MILITARY EQUIPMENT; THICK FILM TECHNIQUES; APPLICATION

02 Section Class Codes: B2210, B2610, B2322

United Class Codes: SEEAS, SHAAV, SMCCAX

## DEPTH: CRITICAL CURRENT: THIN FILM CIRCUITS

06

Section Class Codes: B4230, B2340, B4427  
Unified Class Codes: BECGAY, SGAAAL, BKCRAG

702461 B7525498 HYBRID INTEGRATED OSCILLATOR FOR PUSH-BUTTON DIALLING  
ITO, Y.  
NIPPON TELEGRAPH AND TELEPHONE CORP., MUSASHINO, TOKYO  
ELECTRON. AND COMMUN. JAP. (USA) VOL.57, NO.1 119-26  
JAN. 1974 Coden: ECGJAL  
Circuit: CECIAL  
Circuits: CONSISTING OF THIN-FILM TANTALUM RC ELEMENTS AND BEAM-LEAD IC'S ARE STUDIED WITH A VIEW TO REDUCING THE SIZE OF TELEPHONES. A TWIN-TEE RC CIRCUIT DESIGN TECHNIQUE FOR MINIMIZING THE AREA OCCUPIED BY THE PATTERN IS DESCRIBED AND A DYNAMIC FREQUENCY TRIMMING METHOD USING A SINGLE RESISTIVE ELEMENT TAKES ADVANTAGE OF SMALL RELATIVE DEVIATION OF CAPACITANCES OF THIN-FILM CAPACITORS WITHIN THE SUBSTRATE. PAU CIRCUIT DESIGN CONDITIONS ARE DERIVED FROM THE ANALYSIS OF THE EFFECTS ON THE OSCILLATION FREQUENCY OF THE INPUT AND OUTPUT IMPEDANCES, PHASE SHIFTS, AND VOLTAGE GAIN, WHERE THE FREQUENCY VARIATIONS DUE TO CHANGES IN THE CHARACTERISTICS OF THE CIRCUIT ARE CONSIDERED (8 Refs)  
Descriptors: TELEPHONE STATION EQUIPMENT; OSCILLATORS; HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS; BEAM-LEAD DEVICES

Identifiers: THIN FILM RC OSCILLATOR; BEAM LEAD IC; TWIN T CIRCUIT; MU CIRCUIT; PUSH BUTTON DIALLING; DYNAMIC FREQUENCY TRIMMING METHOD; HYBRID INTEGRATED OSCILLATOR

02

Section Class Codes: B3532, B1850, B2540, B2524  
Unified Class Codes: FECCAY, EIIKAAR, SMEAB, SMCNAM

702491 B7525990 APPLICATIONS OF A ZERO-FREQUENCY SUPERCONDUCTING INDUCTANCE BRIDGE  
MCSEVEY, R.; TEDROW, P.M.; PARASKEVOPoulos, D.  
MIT, CAMBRIDGE, MASS., USA ARGNONE NAT. LAB., ET AL  
IEEE TRANS. MAGN. (USA) VOL. MAG-11, NO.2 720-3 MARCH 1975 Coden: IEMQAQ

1974 APPLIED SUPERCONDUCTIVITY CONFERENCE 30 SEPT. - 2 OCT. 1974 ARGONE, ILL, USA  
THE BRIDGE USES POINT CONTACT SQUIDS AS A CURRENT NULL DETECTOR. THE UNKNOWN AND STANDARD INDUCTORS ARE AT LIQUID HELIUM TEMPERATURE, BUT THE BRIDGE IS BALANCED BY RESISTANCE ADJUSTMENTS AT ROOM TEMPERATURE. THE PRESENT BRIDGE CAN DETECT A CURRENT OF 1 NANOAmp IN 10:1 UP TO IN A MUN INDUCTANCE AND HAS VARIOUS ADVANTAGES OVER AC BRIDGES. THE BRIDGE CAN BE AMPLIFIED IN A NUMBER OF WAYS. THE AUTHORS ARE USING IT TO DETERMINE THE KINETIC INDUCTANCE, PENETRATION DEPTH AND CRITICAL CURRENT OF THIN FILM CIRCUITS. THE BRIDGE IS PARTICULARLY ADAPTED TO MEASURING THE QUANTUM PHASE DIFFERENCE VS. CURRENT OF CURRENT-DEPENDENT INDUCTANCES. SUSCEPTIBILITY AND PRECISION MEASUREMENTS OF INDUCTANCE ARE OTHER POSSIBLE APPLICATIONS. ALTHOUGH THE BRIDGE WAS DEVELOPED TO MEASURE SMALL INDUCTANCES, THE PRINCIPLE CAN BE EASILY APPLIED TO LARGER INDUCTANCES AND MAY BE USEFUL IN LARGE SCALE APPLICATIONS (8 Refs)  
Descriptors: SUPERCONDUCTING DEVICES; BRIDGE INSTRUMENTS; INDUCITIVE MEASUREMENT; FREQUENCY SUPERCONDUCTING INDUCTANCE

02

02

702138 07525113  
MINIATURE PLANE MICROWAVE ANTENNA  
WIEDECK, W.  
ALG-TELEFUNKEN, ULM, GERMANY  
NACHRICHTENTECH. Z. (NZ2) (GERMANY) VOL.28, NO.5 156-9  
MAY 1975. Coden: LAZAA

THIS MICROSTRIP ANTENNA IS PRODUCED IN THICK- OR THIN-FILM TECHNIQUES ON ALUMINUM CERAMIC SUBSTRATES. THE RADIATING ELEMENT IS A SQUARE METALLISED SPOT. THE SIDES BEING LANDA(2), COUPLING IS ACCOMPLISHED BY A COAXIAL LINE THROUGH A HOLE IN THE SUBSTRATE. LINEAR AND CIRCULAR POLARISATION ARE POSSIBLE, BOTH LINEAR AND CENTER FREQUENCY CAN BE MATCHED BY LASER OR ABRASIVE TRIMMING. IN THE PLANE OF THE SUBSTRATE THE ANTENNA DIAGRAM IS ROTATIONAL SYMMETRIC, WHILE THE VERTICAL DIAGRAM IS CARIDAL, THE GAIN IS BETWEEN -3 AND +3 DB (6 Refs.)

Descriptors: MICROWAVE ANTENNA; ANTENNA RADIATION PATTERNS; STRIP LINE COMPONENTS; PRINTED CIRCUITS

Identifiers: MINIATURE ANTENNA: PRINTED CIRCUIT ANTENNA; THICK FILM CIRCUIT; ANTENNA GAIN: THIN FILM CIRCUIT; ANTENNA RADIATION PATTERNS; HALF WAVELENGTH SQUARE ANTENNA; COAXIAL LINE COUPLED; EXPERIMENTAL RESULTS; LINEAR POLARISATION; PLANE MICROWAVE ANTENNA; MICROSTRIP ANTENNA; ALUMINIUM CERAMIC SUBSTRATES; SQUARE METALLISED SPOT; CIRCULAR POLARISATION; TRIMMING

02 Section Class Codes: B322, B3200  
Unified Class Codes: EMC0A, ENM0A  
Language: GERMAN

Identifiers: 1.3 TO 1.7 GHZ; THIN FILM HYBRID AMPLIFIER;  
OPTIMUM PERFORMANCE; LOW COST; SENSITIVITY ANALYSIS; MICROWAVE CIRCUIT DESIGN PHILOSOPHY  
06  
Section Class Codes: B2540, B1820, B1840, B2524  
Unified Class Codes: SMEAB, ETEAO, ETHAB, SMCEAH

7015H9 87524538  
COMPARATIVE CHARACTERISTICS OF THE ELECTRICAL-PHYSICAL PROPERTIES OF COPPER ALLOYS IN THE VACUUM CONDENSATE STATE AND THE SOLID STATE  
PERMAKOV, V.G.; KHARKOV, V.I.; SIDORENKO, S.I.  
RADOTEKHNIKA (USSR) NO.29 59-65 1974  
Coden: RTHAJ  
Abstract: RTHAJ  
DATA ARE OBTAINED ON THESE PROPERTIES OF A NUMBER OF CU-BASED ALLOYS AND VACUUM CONDENSATES OF THOSE ALLOYS. IN ORDER TO ASSESS THEIR SUITABILITY FOR USE AS CONTACT AREAS CONDUCTING BUSBARS AND RESISTORS IN HYBRID-FILM MICROCIRCUITS (9 Refs.)

Descriptors: HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS; ELECTRIC CONDUCTIVITY OF SOLID METALS AND ALLOYS; COPPER ALLOYS

Identifiers: HYBRID IC; ELECTRICAL PROPERTIES; PHYSICAL PROPERTIES; COPPER ALLOYS; VACUUM CONDENSATE; SOLID STATE;  
CONTACT AREAS; CONDUCTING BUSBARS; RESISTORS  
02  
Section Class Codes: B2540, B2524  
Unified Class Codes: SMEAB, SMCEAH  
Language: RUSSIAN

701510 87524539  
DESIGN OF A 1.3-1.7 GHZ THIN-FILM HYBRID AMPLIFIER WITH OPTIMUM PERFORMANCE AT A LOW COST  
CHI-CHIA HSIEH; SHU-PARK CHAN  
UNIV. SANTA CLARA, CALIF., USA  
PARKER, S.R.; ET AL  
NAVAL POSTGRADUATE SCHOOL, UNIV. SANTA CLARA, IEEE, ET AL  
3RD ASILOMAR CONFERENCE ON CIRCUITS, SYSTEMS AND COMPUTERS  
32B-31 1975  
3-15, DEC, 1975, PACIFIC GROVE, CALIF., USA  
WESTERN PERIODICALS, NORTH HOLLYWOOD, CALIF., USA  
DESCRIBES THE DESIGN OF A LOW-NOISE THIN-FILM HYBRID AMPLIFIER AT A FREQUENCY RANGE OF 1.3 TO 1.7 GHZ WITH THE EMPHASIS ON OPTIMIZING ITS PERFORMANCE AT A VERY LOW COST. THE DESIGN OBJECTIVES WERE ACHIEVED WITH A MINIMUM NUMBER OF CIRCUIT ELEMENTS AND A LOW-COST MICROWAVE TRANSISTOR CHIP. BY APPLYING A SENSITIVITY ANALYSIS BEFORE OPTIMIZING THE CIRCUIT, THE NUMBER OF ITERATIONS IN THE OPTIMIZATION ROUTINE WERE GREATLY REDUCED. THE RESULT OF THIS WORK POINTS OUT A NEW MICROWAVE CIRCUIT DESIGN PHILOSOPHY. INSTEAD OF MERELY DESIGNING A CIRCUIT WITH OPTIMUM PERFORMANCE, ONE SHOULD ALSO MAKE CERTAIN THAT THE CIRCUIT IS PRACTICAL ONE WHICH CAN BE MANUFACTURED AT A LOW COST (7 Refs.)  
Descriptors: THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS;  
OPTIMUM PERFORMANCE; ANALYSIS

781548 87524537 THICK-FILM HYBRIDS-WHAT THEY CAN OFFER  
HEWLETT-PACKARD, D.R.  
NEW MARKET TRANSISTORS LTD., ENGLAND  
NEW ELECTRON. (GB) VOL. 8, NO. 6 64, 67-8 18 MARCH 1975  
Coden: NELLAC  
Hybrid microcircuits have become established in a wide range  
of applications, military, industrial, communications, automotive, and aerospace, medical,  
profesional, consumer. They are used to complement the use of I.C.s in  
consumer and automotive applications, thick film technology  
providing the resistor networks and some interconnection  
patterns. The hybrid circuit has developed new market  
features. Instead of being a component in a p.c.b. it has  
become a complete assembly. Besides the economic comparisons,  
an equipment designer when considering the use of thick film  
circuits must consider the benefits he gains from improved  
reliability, improved product consistency, reduced function  
volume, and simulation of new design ideas.

Descriptors: THICK FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS  
Identifiers: THICK FILM HYBRID CIRCUITS; RELIABILITY;  
PRODUCT CONSISTENCY; REDUCED FUNCTION VOLUME  
02 Section Class Codes: B2540, B2524  
Unified Class Codes: SMEAB, SMCEAH

781548 87524533 THE PRODUCTION OF HYBRID CIRCUITS FOR THE DEVELOPMENT OF  
ELECTRONIC EQUIPMENT  
SALEKSKI, G.  
FERNHELDTECHNIK (GERMANY) VOL. 15, NO. 1 15-18 13 FEB.  
1975. Coden: FERHT  
Techniques of manufacturing hybrid circuits are briefly  
reviewed. The importance of economical considerations is  
stressed, with regard to change from conventional to thin film  
circuits. A better choice is offered by the use of hybrid  
circuits, which make use of encapsulated IC's and transistor  
chips. (4 refs.)

Descriptors: INTEGRATED CIRCUIT PRODUCTION: HYBRID  
Identifiers: ENCAPSULATED IC; PRODUCTION OF HYBRID CIRCUITS;  
IMPORTANCE OF ECONOMICAL CONSIDERATIONS; THIN FILM CIRCUITS;  
TRANSISTOR CHIPS  
02 Section Class Codes: B2540  
Unified Class Codes: SMEAB  
Language: GERMAN

ELEKTRONIKA (POLAND) VOL. 16, NO. 3 97-101 1975 Coden:  
EMN102  
DESCRIBES THE CONSTRUCTION, WORKING PRINCIPLE AND PRACTICAL  
EXPERIENCE WITH A PHOTOLITHOGRAPHY PROCESSING PRODUCTION LINE  
(6 refs.)  
Descriptors: THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS;  
PHOTOLITHOGRAPHY; INTEGRATED CIRCUIT PRODUCTION  
Identifiers: THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS;  
INTEGRATED CIRCUIT PROCESSING; PRODUCTION LINE;  
PHOTOLITHOGRAPHY; CONSTRUCTION; WORKING PRINCIPLE; PRACTICAL  
EXPERIENCE  
02 Section Class Codes: B2540, B2524  
Unified Class Codes: SMEAB, SMCEAH  
Language: POLISH

781526 87524447 PERFORMANCE CHARACTERISTICS OF UNIFORM THIN-FILM  
RESISTIVE-CAPACITIVE-RESISTIVE STRUCTURES  
KAMAL, A. K.; AHMED, K.U.; AGARWAL, R.P.; SINHA, H.P.  
UNIV. ROORKEE, INDIA  
MICROELECTRONICS (GB) VOL. 6, NO. 1 6-10 SEPT. 1974  
Coden: MIEC69  
Performance characteristics of a few specimen of uniform  
thin film structures, each consisting of two resistive layers  
of different period-length, resistance separated from one  
another by a dielectric layer are evaluated both theoretically  
and experimentally. The experimental results agree fairly well  
with the theoretical counterparts within the bounds of  
experimental errors. The effect of varying the load on the  
performance characteristics is observed experimentally and the  
results are found to conform to those reported earlier. The  
existence of a null frequency shown by the numerical analysis  
of a low pass filter configuration of the uniform thin film  
structure is also confirmed by experimental observations (6  
refs.)

Descriptors: THIN FILM CIRCUITS; INTEGRATED CIRCUIT  
PRODUCTION; DISTRIBUTED PARAMETER NETWORKS  
Identifiers: THIN FILM DISTRIBUTED NETWORK; PERFORMANCE  
CHARACTERISTICS; THIN FILM; RESISTIVE LAYERS; DIELECTRIC LAYER  
1: NULL FREQUENCY; NUMERICAL ANALYSIS; LOW PASS FILTER  
02 Section Class Codes: B2540  
Unified Class Codes: SMCEAH

781502 87524531 TECHNOLOGICAL PRODUCTION LINE FOR THIN FILM HYBRID  
PHOTOLITHOGRAPHY PROCESSING  
RUDN, W.; SUDLSKI, R.

781525 B752446  
 TRAGER, R.K.  
 SANDIA LABS., ALBUQUERQUE, N.MEX., USA  
 J. VAC. SCI. AND TECHNOL. (USA) VOL.12, NO.1 27  
 JAN-FEB. 1975  
 ABSTRACT: ONLY GIVEN, IN WHICH SELECTION, IMPLEMENTATION AND  
 LIMITATIONS OF THE METALLIZATION SYSTEM ARE MENTIONED (3  
 Refs.)  
 Descriptrors: THIN FILMS; CHROMIUM; GOLD; METALLISATION; THIN  
 FILM CIRCUITS  
 Identifiers: CR-AU FILM METALLISATION: EVOLUTION  
 02  
 Section Class Codes: B2524  
 Unified Class Codes: SMCEAH

781524 B752445  
 ELECTRICAL RESISTANCE OF METALLIZED VIA HOLES  
 AMERICAN VACUUM SOC., ALLENTOWN, PA., USA  
 J.VAC. SCI. AND TECHNOL. (USA) VOL.12, NO.1 88-91  
 21ST OCT. 1974  
 NATIONAL SYMPOSIUM OF THE AMERICAN VACUUM SOCIETY  
 THE RESISTANCE OF HOLES DRILLED BY LASER THROUGH ALUMINA  
 SUBSTRATES AND THE COATED BY EVAPORATION  
 ANALYTICALLY, THE GEOMETRY IS TAKEN IDEALLY AS A CONICAL HOLE.  
 THE EFFECTS OF FOUR-POINT PROBE TECHNIQUES ARE DISCUSSED AND A  
 THE EFFECTIVE EXPRESSION BASED ON CONFORMED MAPPING TECHNIQUES  
 IS GIVEN. THE CASES OF TIPD AND TIPDAU FILMS ARE DISCUSSED.  
 THE SUCH HIGHER RESISTANCE WITHIN THE HOLE IS ATTRIBUTED TO  
 NON-ORTHOGONAL INCIDENCE AND NOT TO SURFACE IRRREGULARITIES  
 (2 Refs.)  
 Descriptrors: METALLISATION; THIN FILM CIRCUITS; ELECTRICAL  
 Conductivity; METALLIC THIN FILMS  
 Identifiers: METALLISED VIAHOLE: AL/SUB 2/D/SUB 3/; SUBSTRATE  
 FILM; TIPDAU FILM; LASER DRILLED VIAHOLE; ELECTRICAL  
 RESISTANCE  
 01.  
 Section Class Codes: B2524  
 Unified Class Codes: SMCEAH

781524 B752442  
 TEMPERATURE COMPENSATED RC-ACTIVE NETWORKS IN THICK FILM  
 KALLEFS, J.  
 INST. NETZWERK SYSTEMTHEORIE, DER UNIV. STUTTGART, GERMANY  
 FREQUENZ (GERMANY) VOL.29, NO.5 147-51 MAY 1975  
 Coden: FORZA3  
 An important condition for the manufacture of communication  
 filters in thick film technology is a low temperature  
 coefficient of the time constants exhibited by the integrated  
 temperature coefficients can be solved by matching the  
 coefficients of R's and C's. It is possible to  
 adjust the TCC to the given TCR by blending two dielectric  
 compositions. Test results of a twin-T network and a C-C ACTIVE  
 lowpass filter of 7th degree are given which demonstrate that  
 thick film circuits can attain the low temperature sensitivity  
 of thin film circuits (4 Refs.)  
 Descriptrors: ACTIVE FILTERS; THICK FILM CIRCUITS  
 Identifiers: RC ACTIVE NETWORK: TEMPERATURE COMPENSATED:  
 02  
 Section Class Codes: B2524, B180  
 Unified Class Codes: SMCEAH, ETRAAM

781523 B752444  
 THIN FILM METALLIZATION AND PATTERN GENERATION TECHNIQUES  
 BELL TELEPHONE LABS. INC., ALLENTOWN, PA., USA  
 INTERNAT. UNION FOR VACUUM SCI. TECHNIQUE AND APPLICATIONS  
 JAP. J. APPL. PHYS. (JAPAN) SUPPL.2, PT.1 A-957 1974  
 Coden: JJPAS  
 PROCEEDINGS OF THE 6TH INTERNATIONAL VACUUM CONGRESS 25-29

781520 07524401  
 THIN FILM CIRCUITS USING TANTALUM TECHNIQUES  
 MILLER, S.  
 ELEKTRON. IND. (GERMANY)  
 VOL. 6, NO.1-2 EP1-4 JAN-FEB.  
 1975 Coden: EKIDAT  
 THE ADVANTAGES OF TANTALUM IN THIN FILM CIRCUITS, COMPARED  
 TO NICKEL/CHROME, IS THAT RESISTORS ARE EASILY ADJUSTED BY  
 ANDIC OXIDATION AND THE RESULTING OXIDE LAYER ALSO ACTS AS A  
 GOOD PASSIVATOR. CAPACITORS WITH TANTALUM OXIDE DIELECTRIC  
 ALSO SHOW ADVANTAGES OF GREATLY INCREASED PACKING DENSITY. THE  
 ARTICLE DESCRIBES PROCESSING AND CHARACTERISTICS OF TANTALUM  
 THIN FILM CIRCUITS. AS WELL AS A BRIEF REVIEW OF THE PRESENT  
 TECHNOLOGICAL STATUS. (20 Refs.)

Disciplines: THIN FILM CIRCUITS; THIN FILM DEVICES; REVIEWS;

TANTALUM

Identifiers: TA TECHNOLOGY; TA/SUB 2/0/SUB 5; THIN FILM  
 CIRCUITS; RESISTORS; ANDIC OXIDATION; PASSIVATOR; CAPACITORS;

PACKING DENSITY; PROCESSING

02  
 Section Class Codes: B2524  
 Unified Class Codes: SMCAE

Language: GERMAN

781519 07524400  
 MULTILAYER THICK FILMS

HILKS, J.

NEW ELECTRON. (GB) VOL.8, NO.6 72 18 MARCH 1975

Coden: NELAC  
 THE MANUFACTURING TECHNIQUES FOR THICK FILM CIRCUITS ARE  
 REVIEWED TOGETHER WITH THEIR APPLICATIONS IN INDUSTRY.  
 OPTOELECTRONICS AND INSTRUMENTATION  
 Designators: THICK FILM CIRCUITS  
 02  
 Identifiers: MULTILAYER THICK FILMS

02  
 Section Class Codes: B2522  
 Unified Class Codes: SMCCAX

EQUIPMENT  
 Descriptors: THICK FILM CIRCUITS; THIN FILM CIRCUITS; HYBRID  
 INTEGRATED CIRCUITS

Identifiers: MULTICHP FILM CIRCUITS; THIN FILM CIRCUITS;  
 PROFESSIONAL APPLICATIONS; THICK FILM; MILITARY APPLICATIONS;  
 PRECISION; STABILITY; ASSEMBLY; ENCAPSULATION; MONOLITHIC  
 CIRCUIT CHIPS

02  
 Section Class Codes: B2522, B2524, B2540  
 Unified Class Codes: SMCCAX, SMCEAH, SMEEAB

781125 07524029  
 ADVANCES IN SUPERCONDUCTING QUANTUM ELECTRONIC MICROCIRCUIT  
 FABRICATION

KIRSCHMAN, R.K.; NOTARY, H.A.; MERCEAU, J.E.

JET PROPULSION LAB., PASADENA, CALIF., USA

AMERICAN PHYS. SOC., IEE, ARGONNE NAT. LAB., ET AL

IEE TRANS. MAGN. (USA) VOL. MAG-11, NO.2 77B-81 MARCH

1975 Coden: IEMAO

1974 APPLIED SUPERCONDUCTIVITY CONFERENCE 30 SEPT. - 2

OCT. 1974 ARGONNE, ILL., USA

STANDARD MICROELECTRONIC FABRICATION TECHNIQUES HAVE BEEN

UTILIZED TO PRODUCE BATCH QUANTITIES OF SUPERCONDUCTING

QUANTUM ELECTRONIC DEVICES AND CIRCUITS. THE OVERALL GOAL IS A

FABRICATION TECHNOLOGY YIELDING CIRCUITS THAT ARE RUGGED AND

STABLE AND CAPABLE OF BEING FABRICATED CONTROLLABLY AND

REPRODUCIBLY IN SIZABLE QUANTITIES. PROGRESS TOWARD THIS GOAL

IS PRESENTED, WITH PRIMARY EMPHASIS ON THE MOST RECENT WORK,

WHICH INCLUDES THE USE OF ELECTRON BEAM LITHOGRAPHY AND

TECHNIQUES OF HYBRID MICROELECTRONICS. SEVERAL PROTOTYPE

MICROCIRCUITS HAVE BEEN SUCCESSFULLY FABRICATED. THESE

MICROCIRCUITS ARE FORMED IN A THIN FILM PARAFFIN MATERIAL

CONSISTING OF LAYERS OF SUPERCONDUCTING AND NORMAL METALS, AND

USE PROPERTIES-EFFECT STRUCTURES AS THE ACTIVE CIRCUIT ELEMENTS

(12 Refs.)

Identifiers: INTEGRATED CIRCUIT PRODUCTION; HYBRID  
 CIRCUITS; SUPERCONDUCTING DEVICES; THIN FILM  
 CIRCUITS; ELECTRON BEAM LITHOGRAPHY; SUPERCONDUCTING  
 QUANTUM ELECTRONIC MICROCIRCUIT FABRICATION; HYBRID  
 MICROELECTRONICS

06  
 Section Class Codes: B2340, B2524, B2540  
 Unified Class Codes: SGAAI, SMCEAH, SMEEAB

781518 07524439  
 THIN AND THICK FILM FOR PROFESSIONAL AND MILITARY  
 APPLICATIONS

B'SHILL, D.

ITT COMPONENTS GROUP EUROPE, HARLOW, ENGLAND

NEW ELECTRON. (GB) VOL.8, NO.6 54-5 18 MARCH 1975

Coden: NELAC

THE FUTURE OF MULTI-CHIP FILM CIRCUIT TECHNOLOGY FOR  
 PROFESSIONAL AND MILITARY USE CAN BE SUMMARISED AS: (1) THE  
 DIFFERENCE IN PRECISION AND STABILITY BETWEEN THIN AND THICK  
 FILMS IS HARMONISING; (2) MAJOR CHANGES ARE EXPECTED IN ASSEMBLY  
 AND ENCAPSULATION METHODS; (3) DEVELOPMENT OF  
 COMPUTER-CONTROLLED AUTOMATIC METHODS OF MANUFACTURE OF  
 COMPLEX MULTI-CHIP CIRCUITS; (4) MONOLITHIC CIRCUIT CHIPS AND  
 FILM TECHNOLOGY PROVIDES A BASIS FOR FUTURE ELECTRONIC

HIPADASTECHNIKA (HUNGARY) VOL.25, NO.12 353-2 DEC.

1974 Coden: MIRAG Code: MIRAG

THE PROCESS OF DESIGNING THICK FILM RESISTORS, THEIR WIRING AND TOPOLOGY IS DESCRIBED. AN EXAMPLE ILLUSTRATES THE COURSE OF THE DESIGN AND THE MAIN CONSTRUCTIONAL PROBLEMS. A COMPUTER PROGRAMME WAS DEVELOPED FOR THE CORRECT TECHNOLOGICAL DESIGN OF THICK FILM RESISTORS. THIS PROGRAMME IS DESCRIBED (3 Refs.)

Description: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS; TOPOLOGY; WIRING; COMPUTER-AIDED CIRCUIT DESIGN; THICK FILM RESISTORS

Identifiers: THICK FILM HYBRID INTEGRATED CIRCUITS; COMPUTER PROGRAM; COMPUTER AIDED DESIGN; DESIGN; THICK FILM RESISTORS; WIRING; TOPOLOGY

02 Section Class Codes: B2522, B2540, CB42

Unified Class Codes: SMCCAK, SMEAAB, VMEEAQ

Language: HUNGARIAN

781022 B7523920  
REVIEW OF THE MARKET FOR P.C.B. AND FILM CIRCUITS  
SHEMELT, H.P. VOL.8, NO.6 41-2 18 MARCH 1975  
NEW ELECTRON. (GB)  
Coden: NSELIC  
Reviews the market for printed circuits, thick and thin microcircuits, thin and thick film hybrids.  
Description: REVIEWS; PRINTED CIRCUITS; THICK FILM CIRCUITS; THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS  
Identifiers: PCB CIRCUITS; PC LAMINATE; THIN FILM MICROCIRCUIT; THICK FILM MICROCIRCUIT; HYBRID IC; REVIEW; FILM CIRCUITS  
02 Section Class Codes: B2230, B2522, B2524, B2540  
Unified Class Codes: SEMAAW, SMCCAK, SMEAAB, VMEEAQ

772755 B7519877, C7514689 COMPUTER-AIDED DESIGN OF THIN-FILM ANODIZATION FIXTURES

1975 Coden: WELA  
BELL LAB., HAWTHORNE, NEW JERSEY, USA VOL.19, NO.1 24-9 JAN.  
WESDEM ELECTRIC ENG. (USA)

THE USE OF A COMPUTER TO PERFORM THE DRAFTING FUNCTIONS REQUIRED IN THE DESIGN OF THIN-FILM ANODIZATION FIXTURES HAS REDUCED DESIGN AND DRAFTING TIME BY 20 DAYS, OR 96 PERCENT. THE CONSTRUCTION TIME HAS BEEN REDUCED BY TWO DAYS, OR 10 PERCENT. THE PRINTOUT PREPARED BY THE COMPUTER IS MORE ACCURATE, AND EASIER TO USE THAN THE DRAWINGS PREPARED BY A DRAFTSMAN. THE REDUCTION IN CONSTRUCTION TIME HAS LED TO A 10-TO-1 ACTUAL REDUCTION IN THE COST OF THE FIXTURE. WITH THE COMPUTER-AIDED DESIGN AND DRAFTING PROCESS, THE PRODUCT COMPUTER PREPARES DETAILED INFORMATION ABOUT DIMENSIONS, ENGINNEERED PROBES, CABLES AND OTHER DESIGN FACTORS. THE COMPUTER USES THIS INFORMATION TO FURNISH SOME 30 PAGES OF FIXTURE DESIGN INFORMATION CONSISTING OF A PROBE-PLATE DRILLING INFORMATION LIST, A WIRING INFORMATION LIST, AND AN ORGANDIE CABLE INTERFACE LIST. THESE LISTS ARE USED TO CONSTRUCT AND MAINTAIN THE FIXTURE. COMPUTER: THIN FILM CIRCUITS; INTEGRATED CIRCUIT PRODUCTION; COMPUTERS; CIRCUITS; ELECTRONICS APPLICATIONS OF COMPUTERS; COMPUTER-AIDED DESIGN; OXIDATION FIXTURES; INTEGRATED CIRCUITS; CAD; THIN FILM ANODISATION FUNCTIONS; CIRCUIT PRODUCTION; THIN FILM FUNCTIONS; DRAUGHTING FUNCTIONS; DESIGN FACTORS

02 Section Class Codes: B2522, C7862, C7441, B2540

Unified Class Codes: SMCCAK, VMEEAQ, VGECAF, SMEAAB

772713 B7519869, C7514643 DESIGN OF THICK FILM INTEGRATED CIRCUITS (RESISTORS)  
RIPHA, G.; PAPP, K.; ALBRECHT, M.  
BME ELEKTRONIKAI TECHNOLÓGIA TANZEK, HUNGARY

771829 B7519868, C7513671 TOWARDS A BETTER UNDERSTANDING OF SCREEN PRINT THICKNESS

HOGWOOD, R.J. HIGHWOOD, R.J. VOL.1, NO.2 129-36

BAC, BRISTOL, ENGLAND; ECTC, SCI. AND TECHNOL. (GB)  
ELECTROCOM, SCI. AND TECHNOL. (GB) DEC. 1974 Coden: ECTCS  
IN RECENT YEARS, A MORE SCIENTIFIC APPROACH TO THE AGE-OLD CRAFT OF SILK SCREEN PRINTING HAS RESULTED IN THE EVOLUTION OF COMPLEX PRECISION-BUILT PRINTING MACHINES FOR USE IN THE COMPUTER MICRO-CIRCUIT INDUSTRY. EVEN SO, KNOWLEDGE OF THE ELECTRONIC PROCESSES INVOLVED IN SCREEN PRINTING IS STILL FAR FROM COMPLETE. AN ATTEMPT IS MADE HERE TO PROVIDE A BETTER UNDERSTANDING OF THE SCREEN PRINTING MECHANISM AND THE EFFECT OF PRINT THICKNESS CONTROL. TWO DIFFERENT PRINTING MODES ARE DESCRIBED AND THE EFFECT OF AN INTERACTION BETWEEN SOME OF THE MORE IMPORTANT MACHINE PARAMETERS IN THIS PILLAR THEORY IS OFFERED WHICH PILLAR THEORY IS OFFERED WHICH REFECTS ARE DISCUSSED. A SIMPLE PILLAR THEORY IS OFFERED WHICH ALLOWS A PREDICTION TO BE MADE OF THE QUANTITY OF INK DEPOSITED BY A GIVEN SCREEN (3 Refs.)  
FUNDAMENTALLY DEPOSITED BY A GIVEN SCREEN  
DOCUMENTORS: INTEGRATED CIRCUIT PRODUCTION; HYBRID  
INTEGRATED CIRCUITS; PRODUCTION CONTROL; THICKNESS CONTROL; THICK FILM CIRCUITS  
Identifiers: PRECISION BUILT PRINTING MACHINES; ELECTRONICS MICROCIRCUIT INDUSTRY; THICK FILMS; SCREEN PRINT THICKNESS CONTROL; SILK SCREEN PRINTING; SIMPLE PILLAR THEORY; QUANTITY OF INK; HYBRID MICROCIRCUITS  
02 Section Class Codes: B2522, C7862, C7441, B2540  
Unified Class Codes: SMCCAK, VMEEAQ, VGECAF, SMEAAB

AD-A062 407

ROCKWELL INTERNATIONAL ANAHEIM CA ELECTRONIC DEVICES DIV. F/G 9/3  
HYBRID TECHNOLOGY COST REDUCTION IMPROVEMENT STUDY PROGRAM. VOLU--ETC(U)  
APR 78 N00163-77-C-0299

UNCLASSIFIED

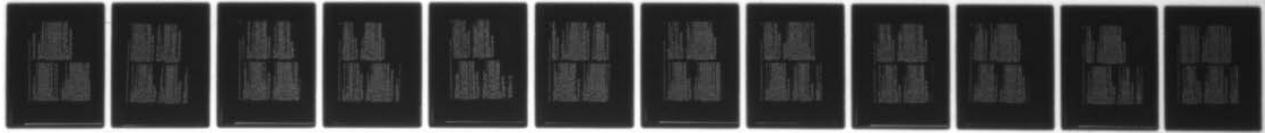
C78-299/501-VOL-2

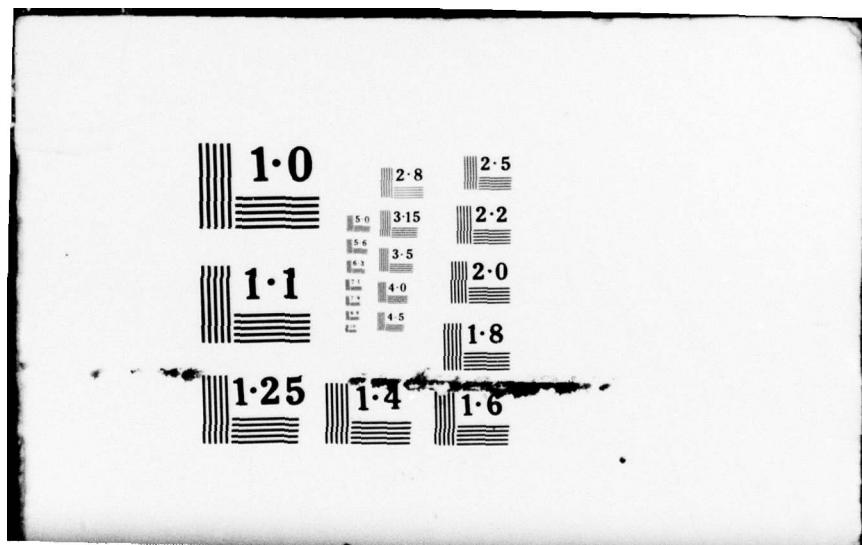
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771078 B7519873, C7513670  
GALVANOMETER CONTROLLED LASER TRIMMING  
CUZZENS, W.  
ELECTRON (GB)  
NO.66 37. 38. 40 16 JAN. 1975 Coden:

GRATIAT DEVELOPMENT EFFORT HAS BEEN SPENT IN RECENT YEARS IMPROVING THE TECHNIQUES OF MANUFACTURING FILM RESISTORS AND FILM HYBRID CIRCUITS. ONE AREA, THE TRIMMING PROCESS, HAS SEEN ESPECIALLY SIGNIFICANT IMPROVEMENT IN COST REDUCTION AND AUTOMATION. TWO MAJOR FACTORS CONTRIBUTE TO THIS IMPROVEMENT: THE SUCCESSFUL APPLICATION OF THE LASER AS A TRIMMING TOOL AND THE INVENTION OF THE GALVANOMETER BEAM POSITIONER. BECAUSE OF THESE AND OTHER ADVANCES, TRIMMING NEED NO LONGER BE THE SLOWEST AND MOST COSTLY PART OF THE PRODUCTION PROCESS. DIRECTORS: THIN FILM RESISTORS; THIN FILM CIRCUITS; LASER BEAM; MACHINING; POSITION CONTROL; GALVANOMETERS; INTEGRATED CIRCUIT PRODUCTION

Identifiers: LASER TRIMMING; FILM HYBRID CIRCUITS; COST REDUCTION; AUTOMATION; GALVANOMETER BEAM POSITIONER; FILM RESISTORS

02 Section Class Codes: B2524, B2210, B2980, B1267, C7862.

C7441 Unified Class Codes: SMCEAH, SEEAAH, EGMAAA, ADGKAT, VMEAE, VGECAF

06 Section Class Codes: B2524, B254, B2522  
Unified Class Codes: SMEAB, SMCEAH, SMCCAX

768491 A7535338, B7519938  
THIN FILM CRYOGENIC AMPLIFIER  
KRAMER, G.  
AEROTEC ELECTROSYSTEMS CO., AZUSA, CALIF., USA  
INTERNAT. UNION FOR VACUUM SCI., TECHNIQUE AND APPLICATIONS  
JAP. J. APPL. PHYS. (JAPAN) SUPPL. 2, PT. 1 H.13-5 1974  
Coden: JIAPAS  
Proceedings of the 6th International Vacuum Congress 25-29 MARCH 1974 KYOTO, JAPAN

A THREE-STAGE AMPLIFIER, DESIGNED FOR CRYOGENIC APPLICATIONS, EMPLOYING ALL THIN-FILM COMPONENTS, I.E., THIN-FILM TRANSISTORS, THIN-FILM DIODES, THIN-FILM CAPACITORS AND THIN-FILM RESISTORS, IS DESCRIBED. THE TFTS USED IN THIS THIN-FILM INTEGRATED CIRCUIT (TFCIC) EXHIBIT SATISFACTORY STABILITY AND RELATIVELY LOW NOISE AT CRYOGENIC TEMPERATURES, AT A TEMPERATURE OF 7K, AND FREQUENCY OF 500 Hz. THE AMPLIFIER EXHIBITS A VOLTAGE GAIN OF GREATER THAN 100 AND A NOISE LEVEL OF 400 NANOVOLTS/SQ ROOT Hz. THE FREQUENCY RANGE OF OPERATION IS 1 Hz TO 10 kHz. AN ARRAY OF 102 DISCRETE AMPLIFIERS ARE DEPOSITED ON A TWO INCH SQUARE SUBSTRATE BY ADDITIVE EVAPORATION PROCESSES IN A SINGLE PUMPDOWN OF THE VACUUM SYSTEM. EACH AMPLIFIER CONTAINS 3 THIN-FILM TRANSISTORS, 6 THIN-FILM DIODES, 4 THIN-FILM RESISTORS AND 3 THIN-FILM CAPACITORS

06 Section Class Codes: A0660, A0624, B2540, B1840  
Unified Class Codes: BGMAAH, BGFEAH, SMEAAB, ETHAA8

768495 B7519942  
FILM HYBRID CIRCUITS FOR LSI

HARWOOD, G.  
MULLAND LTD., MITCHAM, ENGLAND  
ALARD LECTURE SERIES NO. 75 CUSTOM DESIGN FOR LARGE SCALE INTEGRATION (LSI) 4/1-16 1975

21-25 APRIL 1975 LONDON, ENGLAND

ALARD NEUILLY SUR SEINE, FRANCE

CONSIDERS BOTH THICK AND THIN FILM HYBRID TECHNOLOGIES FOR USE WITH LSI DEVICES. MATERIALS USED FOR THE PASSIVE PART OF THE CIRCUIT AND THEIR PROPERTIES ARE CONSIDERED WITH REGARD TO INTERACTION WITH BONDING MATERIALS. TYPES OF INTEGRATED AND ATTACHED COMPONENTS ARE DISCUSSED WITH PARTICULAR REFERENCE TO RESISTORS, CAPACITORS AND SEMI-CONDUCTORS. MATERIALS AND TECHNIQUES USED FOR ATTACHING COMPONENTS TO THE FILM CIRCUIT ARE INDICATED AND A SELECTION OF THOSE MOST LIKELY TO GIVE LONG SERVICE AND GOOD PERFORMANCE ARE MADE. THE EFFECTS OF ENVIRONMENTAL TREATMENT AND OF PACKAGING IN VARIOUS WAYS ARE CONSIDERED AND THE MOST SUITABLE WAYS OF PROTECTING THE COMPONENTS SENSITIVE TO MECHANICAL DAMAGE AND HOSTILE ENVIRONMENTS ARE SET OUT. A SUMMARY OF IMPORTANT ASPECTS OF DESIGN OF FILM HYBRIDS FOR LSI IS MADE (129 Refs)

06 Section Class Codes: A0660, A0624, B2540, B1840  
Unified Class Codes: BGMAAH, BGFEAH, SMEAAB, ETHAA8

06 Section Class Codes: A0660, A0624, B2540, B1840  
Unified Class Codes: BGMAAH, BGFEAH, SMEAAB, ETHAA8  
THIN FILM CIRCUITS: HYBRID INTEGRATED CIRCUITS  
Identifiers: THIN FILM CIRCUIT; LARGE SCALE INTEGRATION;  
SEMICONDUCTORS: FILM HYBRID CIRCUITS; THIN FILM HYBRID  
TECHNOLOGIES; RESISTORS; CAPACITORS; FILM CIRCUIT; PACKAGING;  
EFFECTS OF ENVIRONMENTAL TREATMENT

768149 87519874 PRODUCTION OF THIN FILM NETWORKS BY MEANS OF ELECTROEROSION MICRO-ENGRAVING. ILLYERAVI VITZ, ZS. B.S. ELEKTRONIKAI TECNOLOGIA TANSZER, HUNGARY HIRATASTECHNIKA (HUNGARY) VOL.25, NO.12 363-5 DEC.

Micro-Engraving by electroerosion of a thin film is a wide-spread method of tricing thin film resistors and capacitors of integrated circuits. Tests were made to clarify the physics of the electroerosion and to optimize the parameters of technology. As a result of further development of the procedure, the quality of the adjusted elements has improved and the possibility of the development of a complete topology of resistance networks by micro-engraving was established. (3 Refs)

Descriptor: THIN FILM CIRCUITS: THIN FILM RESISTORS: THIN FILM CAPACITORS: INTEGRATED CIRCUIT PRODUCTION: THIN FILM CAPACITORS: ELECTROEROSION: MICROENGRAVING: THIN FILM RESISTORS: PARAMETER OPTIMISATION: THIN FILM NETWORKS: THIN FILM RESISTORS: INTEGRATED CIRCUITS: TOPOLOGY 02

Section Class Codes: B2524  
Unified Class Codes: B2524  
Language: HUNGARIAN

7604111 87519872 IMPROVEMENT OF THICK FILM CIRCUIT ELEMENT Patent No.: UK 1377662 Assignees: ELECTRONIC COMPONENTS AB Filed: 26 FEB. 1973 Priority Date: 1 MAR 1972 IN DEC. 1974

A thick-film printed circuit for use at radio frequencies comprises a substrate having printed components on each side. One of the components on one side having an earth area printed with conductive ink and some of the components on the other side of the substrate being located directly opposite the earth area. Discrete components are also connected to the printed components. The arrangement minimizes alteration in the basic characteristics of the circuitry by unwanted coupling

Descriptors: PRINTED CIRCUITS: EARTHING: THICK FILM CIRCUITS AREA: CONDUCTIVE INK: COUPLING 01

Section Class Codes: B2522, B2230  
Unified Class Codes: SMCCAX, SEMAAW

ELECTROCOMON. SCI. AND TECHNOL. (GB) VOL. 1, NO. 2 141-4 DEC. 1974 Coden: ECST5 Test circuits were printed and measured. A microstrip launcher was used to connect directly into the circuit, while a shorting bar connected to the plate holding launcher made the ground contact. As capacitor values of interest are of the order of 1 pF, interdigital capacitors were used. As these had previously been found to have low loss and well-defined capacitance, a Hewlett-Packard type 35822 transistor was selected which was in a form suitable or a attachment to thick film conductors and completely characterised at the operation frequency. To improve stability and lower transistor noise the common emitter connection was employed. (4 Refs)

Descriptors: MICROWAVE AMPLIFIERS: HYBRID INTEGRATED CIRCUITS Identifiers: HEWLETT PACKARD TYPE 35822 TRANSISTOR: MICROSTRIP LAUNCHER: SHORTING BAR: PLATE HOLDING LAUNCHER: GROUND CONTACT: INTERDIGITAL CAPACITORS: THICK FILM CONDUCTORS 02

Section Class Codes: B1840, B2540, B2522  
Unified Class Codes: ETHAB, SMEAB, SMCCAX

758196 87516643, C7511147 CONTROLLABLE L.V. AUDIO AMPLIFIER FOR MINIATURE RECEIVER Patent No.: UK 1377143 Assignees: MOTOROLA INC Filed: 25 May 1972 Priority Date: 9 JUNE 1971 Original Patent Appl. No.: US 151461 11 DEC. 1974

A battery operated radio pager has an audio amplifier with an integrated circuit chip combined with other components on a thick film, designed for high stability at low operating voltages. In a very compact design, and which includes a preamplifier on the thick film and a power amplifier on the chip, turned off, but switched on when a paging time is received

Descriptors: MOBILE RADIO SYSTEMS: AUDIO-FREQUENCY AMPLIFIERS: PREAMPLIFIERS: RADIO RECEIVERS: THICK FILM CIRCUITS: COMMUNICATIONS APPLICATIONS OF CONTROL Identifiers: BATTERY OPERATED RADIO PAGER: AUDIO AMPLIFIER: INTEGRATED CIRCUIT CHIP: THICK FILM: PREAMPLIFIER: POWER AMPLIFIER 08

Section Class Codes: B3566, B1840, C7883, C7895  
Unified Class Codes: FERRAG, ETHAB, VMTGAL, VMZMAB

767044 87519155 1.8 GHZ LUMPED COMPONENT THICK FILM AMPLIFIER ALLEN, C.P.; TUCKER, C.E.; WOODCOCK, K.W.; BARNWELL, P.G. BRITISH POLYTECH., ENGLAND

## Unified Class Codes: SMCEAH, SMCAAL

75565A B7516785  
MODULE CHASSIS 1V-A CONCEPT OF COLOUR RECEIVER WITH COLD  
CHARS (DESIGN USING THICK AND THIN FILM CIRCUITS)  
DAMGSCHAT, R.  
SIEMENS AG, MUNCHEN, GERMANY  
CHORNEN'S REP. (GERMANY) VOL.9, NO.5 DEC. 1974  
Coden: CNECC3

FOR SOME YEARS NOW, THERE HAS BEEN A DEFINITE TREND TOWARDS MODULARIZATION IN COLOUR TELEVISION SETS. MOST OF THE NEW DEVICES NOW SHOWN A LAYOUT MODULARIZED TO A GREATER OR LESSER EXTENT. IN THIS LABORATORY DEVELOPMENT OF MODULE TECHNOLOGY WITH PARTICULAR RESPECT TO THE POWER SUPPLY AND POWER STAGES AND NOT ONLY OF SMALL SIGNAL STAGES, HAS BEEN CARRIED OUT. FROM EXPERIENCE, POWER STAGES HAVE A RELATIVELY HIGH FAILURE RATE AND ALSO GIVE THE SERVICE TECHNICIAN MORE DIFFICULTIES. THE SYSTEM DESCRIBED TAKES INTO ACCOUNT THE USE OF THIN AND THICK FILM CIRCUITS. THE PRESENT CONCEPT INTENDS TO INITIATE VALUABLE DESIGN OF MODULE COLOUR TV SETS WITH SPECIAL ATTENTION TO THE INTERFACES: COLOUR TELEVISION RECEIVERS: MODULES: THICK FILM CIRCUITS: THIN FILM CIRCUITS DESIGN: THICK FILM CIRCUITS: COLD CHASSIS: THIN FILM CIRCUITS

02 Section Class Codes: B3740, B2522, B2524  
Unified Class Codes: F4GAAM, SMCCAX, SMCEAH

75565A B7515398  
THIN FILM PATTERNS WITH SLOPING EDGES  
MICROELECTRON. AND RELIAB. (GB) VOL. 14, NO.1 69 FEB.  
1975; Coden: MCRLAS

DISCUSSES A NEW METHOD WITH WHICH IT IS POSSIBLE TO PRODUCE ETCHED PATTERNS HAVING GENTLY SLOPING SIDES FOR THIN FILM DEVICES AND OTHER INTEGRATED CIRCUITS. THE ANGLE OF SLOPE CAN HERE BE ADJUSTED WITHIN WIDE LIMITS AND IS REPRODUCIBLE. AN AUXILIARY FILM IS FIRST APPLIED TO THE SURFACE WHICH IS TO BE PROCESSED. THIS AUXILIARY FILM HAS THE PROPERTY OF ETCHING AWAY MORE QUICKLY IN THE ETCHING AGENT USED THAN THE MATERIAL WHICH IT IS INSERED TO PROTECT. IN THE COURSE OF ETCHING THIS LAYER TO A SLOPE WITH UNIFORM INCLINATION, THE METHOD HAS BEEN WORKED OUT FULLY FOR THIN FILMS OF GOLD, OF PERMALLOY AND SILICON DIOXIDE (UP TO ABOUT 10 MICRONS THICK). IT IS POSSIBLE TO ADJUST THE ANGLE OF SLOPE AS DESIRED, TO BETWEEN 1 DEGREES AND ABOUT 60 DEGREES BY VARYING OF THE COMPOSITION OF THE ETCHING AGENT OR OF THE AUXILIARY FILM. MICROGRAPH OF A TREATED FILM OF SILICON OXIDE ON SILICON IS SHOWN

02 Descriptrors: THIN FILM PATTERNS  
CIRCUITS: THIN FILM DEVICES  
Identifiers: Au FILMS: SiO/Si SUB 2/ FILMS: THIN FILM PATTERNS;  
SLOPING EDGES: THIN FILM DEVICES: INTEGRATED CIRCUITS; NEW  
METHOD: ETCHED PATTERNS: AUXILIARY FILM: ETCHING AGENT;  
PERMALLOY: MICROGRAPH

02 Section Class Codes: B2522  
Unified Class Codes: B2524

## Unified Class Codes: SMCEAH, SMCAAL

756402 B7515397  
FACILITIES, EQUIPMENT, AND MANUFACTURING OPERATIONS FOR CIRCUIT DEPOSITION AND TESTING (THICK FILM CIRCUIT MANUFACTURE)  
COTE, R.E.

INTEGRATED CIRCUITS INC., BELLEVUE, WASH., USA  
SOLID STATE TECHNO. (USA) VOL.18, NO.1 APR-52 JAN.  
1975; Coden: SSTEAP

THE FACILITIES REQUIRED TO SCREEN PRINT, FIRE, AND ADJUST THE THICK FILM COMPONENTS ARE EXAMINED. THE SUBJECT IS EXPLORED IN SUFFICIENT DETAIL TO ALLOW THE READER TO UNDERSTAND THE PROCESS, ALONG WITH ITS ADVANTAGES AND DISADVANTAGES. THE INFORMATION REQUIRED TO AVOID THE USUAL PITFALLS IS GIVEN. Descriptrors: THICK FILM CIRCUITS: INTEGRATED CIRCUIT IDENTIFIERS: THICK FILM CIRCUITS: SCREEN PRINTING: RESISTOR ADJUSTMENT: THICK FILM CIRCUIT FIRING: INTEGRATED CIRCUIT PRODUCTION: FACILITIES: EQUIPMENT: MANUFACTURING OPERATIONS: CIRCUIT DEPOSITION: TESTING: THICK FILM COMPONENTS

02 Section Class Codes: B2522, B2210  
Unified Class Codes: SMCCAX, SEEAS

756401 B7515306  
NOVEL SCREEN PRINT STENCILS FOR THICK FILM TECHNIQUE  
SCHNEIDER, J.  
ELEKTRON. IND. (GERMANY) VOL.5, NO.12 EP115 DEC. 1974  
Coden: EK10AT

THE METHOD EMPLOYS A 40-70 MICRON THICK PHOTOPOLYMER FILM WHICH RESISTS ELECTROLYTIC BATHS, ETCHANTS AND A NUMBER OF SOLVENTS. THE PROCESS OF STENCIL PREPARATION IS BRIEFLY DESCRIBED. A RESOLUTION OF 50 MICRONS CAN BE ACHIEVED. THE STENCILS CAN BE USED FOR SEVERAL THOUSAND PRINTS THEN REMOVED WHEN THE SCREEN IS AVAILABLE FOR FURTHER APPLICATIONS. Descriptrors: THICK FILM CIRCUITS: INTEGRATED CIRCUIT PRODUCTION  
Identifiers: 40 TO 70 MICRON THICK PHOTOPOLYMER FILM:  
ETCHANT RESIST: THICK FILM CIRCUITS: ELECTROLYTIC BATH RESIST;  
SOLVENT RESIST: 50 MICRON RESOLUTION: SCREEN PRINT STENCILS

02 Section Class Codes: B2522  
Unified Class Codes: GERMAN  
Language: GERMAN

754043 87514955  
DESIGN AND CONSTRUCTION OF ACTIVE RC FILTERS (INTEGRATED CIRCUITS)  
BOSSELMANN, W.  
ELEKTRON. IND. (GERMANY) VOL.5, NO.12 271-3 DEC. 1974  
Codon: EKIDAT  
THE TECHNICAL FEASIBILITY OF REPLACING CONVENTIONAL PASSIVE LC NETWORKS FOR LOW FREQUENCIES (BELLOW 20 KHZ) WITH ACTIVE RC FILTERS IS DISCUSSED. CONSIDERING THE USE OF ADVANCED TANTALUM FILM TECHNOLOGY WITH INTEGRATED OPERATIONAL AMPLIFIERS (5 Refs.)  
Descriptors: ACTIVE FILTERS: THIN FILM CIRCUITS: HYBRID INTEGRATED CIRCUITS  
Identifiers: DESIGN: CONSTRUCTION: ACTIVE RC FILTERS; FEASIBILITY: PASSIVE LC NETWORKS: BELOW 20 KHZ; INTEGRATED OPERATIONAL AMPLIFIERS; ADVANCED TA FILM TECHNOLOGY; LF 02  
Section Class Codes: B1880, B2524, B2540  
Unified Class Codes: E1C4AAN, SMEAH, SMEAB  
Language: GERMAN

753899 87514771  
HYDRODYNAMICALLY PUMPED STRIPLINE DOWN-CONVERTER  
SHEINER, M. V.; SNELL, M. W. JR.  
BILL LABS., HOLLOWELL, N.J., USA VOL. MIT-23.  
IEEE TRANS. MICROWAVE THEORY AND TECH. (USA) NO. 3 MARCH 1975 Codon: LETMAR

A NOVEL THIN-FILM DOWN-CONVERTER WHICH IS PUMPED AT A SUBMULTIPLE OF THE LOCAL OSCILLATOR FREQUENCY HAS BEEN GIVEN A CONVENTIONAL BALANCED MIXER. THE CONVERTER CONSISTS OF TWO STRIPLINE FILTERS AND TWO SCHOTTKY-BARRIER DIODES WHICH ARE SHUZZED MOUNTED IN A STRIP TRANSMISSION LINE. THE CONVERSION LOSS IS MEASURED AT A SIGNAL FREQUENCY OF 3.5 GHZ IS 3.2 DB FOR A PUMP FREQUENCY OF 1.7 GHZ AND 4.9 DB FOR A PUMP FREQUENCY OF 0.85 GHZ. THE CIRCUIT LOOKS ATTRACTIVE FOR USE AT MILLIMETER-WAVE FREQUENCIES WHERE STABLE PUMP SOURCES WITH LOW FM NOISE ARE NOT READILY AVAILABLE (14 Refs.)  
Descriptors: DIAMETRIC Devices: SOLID-STATE MICROWAVE CIRCUITS; FREQUENCY CONVERSIONS: STRIP LINES; THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS  
Identifiers: THIN FILM STRIPLINE CIRCUIT: HARMONICALLY PUMPED DOWN CONVERTER; MIC: BALANCED MIXERS; SCHOTTKY BARRIER DIODES; FM NOISE: STRIPLINE FILTERS 02  
Section Class Codes: B1810, B1820, B2522, B2540  
Unified Class Codes: E1C4AAN, E1E4AD, SMEAH, SMEAB

746926 87511715, C7509539  
THIN-FILM MEMORY WITH A 400 NS CYCLE  
MAYERIK, R.; KOL, A.  
ELTECH, CASS. (CZECHOSLOVAKIA) VOL.26, NO.1 43-52

1975 Coden: ELKCA9  
IN THE WORK A DESCRIPTION IS GIVEN OF A FAST MEMORY, USING THIN-FILM MEMORY ELEMENTS WITH DESTRUCTIVE READING. THE FUNCTION OF THIN-FILM MEMORY ELEMENTS IS MENTIONED, AS WELL AS THE MEMORY BLOCK, AND THE MAIN ELECTRONIC CIRCUITS OF THE MEMORY. PARAMETERS ARE GIVEN OF VARIOUS ELECTRONIC CIRCUITS AS WELL AS OF THE COMPLETE MEMORY (18 Refs.)  
Descriptors: THIN FILM CIRCUITS: SEMICONDUCTOR STORAGE DEVICES  
Identifiers: THIN FILM MEMORY: 400 NS CYCLE; DESTRUCTIVE READING; ELECTRONIC CIRCUITS; PARAMETERS 02  
Section Class Codes: B2524, C9560  
Unified Class Codes: SMEAH, XKAAX  
Language: SLOVAK

743246 87511778  
MULTIPLE POSITION NEST FOR BONDING  
FOWLER, W.H.  
WESTERN ELECTRIC CO., ALLENTHON, PA., USA  
TECH. DIG. (USA) NO. 36 9-10 OCT. 1974 Codon: TCHDAY  
DESCRIBES A POSITIONING DEVICE FOR BONDING SEMICONDUCTOR DEVICES TO THIN-FILM CIRCUITS USING A HORIZONTAL PLATE REQUIRED TO SUPPORT THE CIRCUITS IN RELATION TO THE BONDING THIEN-FILM CIRCUIT. THE SUPPORT PLATE HAS A NEST FORMED IN IT FOR THE THIN-FILM CIRCUIT TO POSITION THE CIRCUIT SO THAT A BONDING SITE IS LOCATED DENEATH THE BONDING THERMOME. NOMINALLY ONE PLATE, WITH THE NEST APPROPRIATELY LOCATED, IS USED FOR EACH SUPPORT PLATE ON A PARTICULAR THIN-FILM CIRCUIT. THE NUMBER OF SUPPORT PLATES MAY BE REDUCED BY SEPARATING THE NEST FROM THE PLATE AS DESCRIBED (11 Refs.)  
Descriptors: THIN-FILM CIRCUITS: HYBRID INTEGRATED CIRCUITS; INTEGRATED CIRCUIT PRODUCTION  
Identifiers: THIN FILM CIRCUITS; CIRCUIT POSITIONING DEVICE; BONDING SITE LOCATION; MULTIPLE POSITION NEST FOR BONDING; BONDING SEMICONDUCTOR DEVICES; BONDING THERMOME; SUPPORT PLATE 02  
Section Class Codes: B2560, B1269  
Unified Class Codes: SMEAH, ADGAE

746926 87511715, C7509539  
THIN-FILM MEMORY WITH A 400 NS CYCLE  
MAYERIK, R.; KOL, A.  
ELTECH, CASS. (CZECHOSLOVAKIA) VOL.26, NO.1 43-52

743245 07511777  
SOLDERING OF HYBRID INTEGRATED CIRCUITS  
KAGAYAMA, M.; YOSHIMAWA, T.; MINAGUCHI, T.  
AIRIITSU ELECTRIC CO. LTD., TOKYO, JAPAN  
AIRIITSU TECH. BULL. (JAPAN) NO.30 127-31 DEC. 1973  
Code: ANTRAE  
This article is concerned with the adhesion strength of soldered lead-wires and also the fixation of circuit films by soldering. These effects depend upon the film materials, the combinations of layered films and their thickness. Experimental studies, employing smoothed-alumina substrates have been conducted in combinations of TA/SUB 2/N, CR or NiCr, Au and Au plating. The results are presented and discussed (2 refs.)  
Descriptors: HYBRID INTEGRATED CIRCUITS; SOLDERING; MECHANICAL STRENGTH; THIN FILM CIRCUITS; INTEGRATED CIRCUIT TESTING  
Identifiers: HYBRID INTEGRATED CIRCUIT: ADHESION STRENGTH OF SOLIDIFIED LEAD WIRES; FIXATION OF CIRCUIT FILMS; SOLDERING; COMBINATIONS OF LAYERED FILMS; SUBSTRATES  
02  
Section Class Codes: B2560, B2540, B2524  
Unified Class Codes: SMCAAB, SMEAAH, SMCEAH  
Language: JAPANESE

J. INST. ELECTRON. AND TELECOMMUN. ENG. (INDIA)  
NO. 3-4 119-21 MARCH-APRIL 1974 Coden: JIETAU  
A THIN FILM COLPITTS TYPE 3.155 MHZ CRYSTAL OSCILLATOR HAS BEEN DESIGNED AND FABRICATED. THIS MEETS THE REQUIREMENTS OF HIGH STABILITY COMBINED WITH SMALL PHYSICAL DIMENSIONS. BOTH THE CIRCUIT AND THE CRYSTAL ARE CONTAINED WITHIN A THERMOSTAT CONTROLLED OVEN AS PROTECTION AGAINST AMBIENT TEMPERATURE CHANGES. (7 refs.)  
Descriptors: THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; OSCILLATORS; FREQUENCY STABILITY; CRYSTAL RESONATORS; OVENS  
Identifiers: THIN FILM HYBRID IC; COLPITTS CRYSTAL OSCILLATOR; 3.155 MHZ; HIGH STABILITY; SMALL PHYSICAL DIMENSIONS; TEMPERATURE CONTROLLED OVEN  
02  
Section Class Codes: B2540, B1850  
Unified Class Codes: SMEAAH, SMCEAH, ETRAA

743246 07511776  
WIRE BONDING FOR THIN-FILM INTEGRATED CIRCUIT  
KAGAYAMA, M.; YOSHIMAWA, T.; NISHIMURA, Y.  
AIRIITSU ELECTRIC CO. LTD., TOKYO, JAPAN  
AIRIITSU TECH. BULL. (JAPAN) NO.30 121-6 DEC. 1973  
Code: ANTRAE  
The bonding strength of leadwires depends upon the film materials. The combinations of layered films and their thickness, and the heating conditions of substrates. Experimental studies, employing smoothed-alumina and glass substrates, have been conducted in combinations and heating conditions of TA/SUB 2/N, NiCr, Au and Au plating. The results are presented and discussed (4 refs.)  
Descriptors: THIN FILM CIRCUITS; MECHANICAL STRENGTH; WIRES (ELASTIC); JOINING PROCESSES; INTEGRATED CIRCUIT TESTING  
Identifiers: THIN FILM IC; BONDING STRENGTH OF LEADWIRE; COMBINATIONS OF LAYERED FILMS; HEATING CONDITIONS OF SUBSTRATES  
02  
Section Class Codes: B2560, B2524  
Unified Class Codes: SMCAAB, SMEAAH  
Language: JAPANESE

J. INST. ELECTRON. AND TELECOMMUN. ENG. (INDIA)  
NO. 3-4 119-21 MARCH-APRIL 1974 Coden: JIETAU  
A THIN FILM COLPITTS TYPE 3.155 MHZ CRYSTAL OSCILLATOR HAS BEEN DESIGNED AND FABRICATED. THIS MEETS THE REQUIREMENTS OF HIGH STABILITY COMBINED WITH SMALL PHYSICAL DIMENSIONS. BOTH THE CIRCUIT AND THE CRYSTAL ARE CONTAINED WITHIN A THERMOSTAT CONTROLLED OVEN AS PROTECTION AGAINST AMBIENT TEMPERATURE CHANGES. (7 refs.)  
Descriptors: THIN FILM CIRCUITS; HYBRID INTEGRATED CIRCUITS; OSCILLATORS; FREQUENCY STABILITY; CRYSTAL RESONATORS; OVENS  
Identifiers: THIN FILM HYBRID IC; COLPITTS CRYSTAL OSCILLATOR; 3.155 MHZ; HIGH STABILITY; SMALL PHYSICAL DIMENSIONS; TEMPERATURE CONTROLLED OVEN  
02  
Section Class Codes: B2540, B1850  
Unified Class Codes: SMEAAH, SMCEAH, ETRAA

743247 07511772  
NEW ALUMINA SUBSTRATE FOR HYBRID INTEGRATED CIRCUITS  
NIWA, K.; NAKAMURA, J.; MURAKAWA, K.; NAKAMURA, M.  
FUJITSU LABS. LTD., NAKAHARAKU, KAWASAKI, JAPAN  
TEEE TRANS. PARTS, HYBRIDS AND PACAG. (USA) VOL. PHP-10.  
NO. 4 262-6 DEC. 1974 Coden: IEPHAA  
A NEW ALUMINA SUBSTRATE WHICH INCLUDES CR/SUB 2/0/SUB 3/ AND MGO AS THE CERAMICS. WITH AN EXTREMELY SMOOTH SURFACE IS DEVELOPED. RELIABILITY DATA AND CHARACTERISTICS OF TANTALUM NITRIDE OR TANTALUM AND TANTALUM OXIDE FILMS ON THE NEW SUBSTRATE ARE COMPARED WITH THOSE ON THE GLAZED ALUMINA (9 Refs.)  
Descriptors: SUBSTRATES; HYBRID INTEGRATED CIRCUITS; INTEGRATED CIRCUIT PRODUCTION; THIN FILM CIRCUITS  
Identifiers: HYBRID IC; RELIABILITY DATA; TA/SUB 2/N FILM; CAPACITOR PROPERTIES; RESISTOR PROPERTIES; SURFACE TOPOGRAPHY; ALUMINA SUBSTRATE  
02  
Section Class Codes: B2540, B2524  
Unified Class Codes: SMEAAH

743241 07511773  
THIN FILM HYBRID CRYSTAL OSCILLATOR  
DUNNY, G.C.; SINGH, R.A.  
SOLID STATE PHYS. LAB., DELHI, INDIA

743239 87511771  
CHARACTERIZATION OF A CHROMIUM-GOLD DEPOSITION PROCESS FOR  
THE PRODUCTION OF THIN FILM HYBRID MICROCIRCUITS  
CLAY, F. -; PANOISIS, N.T.; PIERCE, R.W., JR.  
BENIX CORP., KANSAS CITY, MO., USA  
IEEE TRANS. PARTS, HYBRIDS, AND PACKAG. (USA) VOL. PHP-10.  
NO. 4 258-62 DEC. 1974 Coden: IEPHA  
DESCRIBES THE EFFECT OF CHROMIUM DEPOSITION RATE, GOLD  
DEPOSITION RATE, AND SUBSTRATE TEMPERATURE ON THE ADHESION,  
RESISTIVITY AND THERMOCOMPRESSION BONDABILITY OF THE FILM  
PRODUCT. TANTALUM NITRIDE COATED ALUMINUM OXIDE SUBSTRATES  
WERE USED IN THIS WORK. THE ADHESION WAS CHECKED USING THE  
STANDARD TAPE TEST; THE RESISTIVITY WAS MEASURED USING A FOUR  
POINT PROBE; AND THE BONDABILITY WAS EVALUATED USING BOTH FINE  
WIRES AND LEAD FRAMES. AUGER ELECTRON SPECTROSCOPY WAS USED TO  
MONITOR THE SURFACE OF THE FILM (19 Refs.)

D-Subj: HYBRID INTEGRATED CIRCUITS: INTEGRATED CIRCUIT  
PRODUCTION: METALLIC THIN FILMS: ADHESION: THIN FILM CIRCUITS  
Identifiers: CR DEPOSITION RATE: AU DEPOSITION RATE;  
SPECROSCOPY: TA/SUB 2 IN COATING: ALUSO/0/SUB 3/ SUBSTRATE;  
DIFFUSION: THIN FILM HYBRID MICRO CIRCUITS: SUBSTRATE  
TEMPERATURE: RESISTIVITY: ADHESION: THERMOCOMPRESSION  
BONDABILITY

02  
Section Class Codes: B2540, B2524  
Unified Class Codes: SMEAB, SMEAH

743239 87511770  
AN APPROACH FOR EVALUATING POLYMER MATERIALS AS PROTECTIVE  
COATINGS ON HYBRID MICRO CIRCUITS  
SEZDIN, J.R.  
WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA., USA  
IEEE TRANS. PARTS, HYBRIDS, AND PACKAG. (USA) VOL. PHP-10.  
NO. 4 251-7 DEC. 1974 Coden: IEPHA  
RESULTS ARE DISCUSSED OF AN EVALUATION PROGRAM WHICH IS IN  
TERMS OF SEVEN POTENTIAL MECHANISMS BY WHICH COATINGS COULD  
FAIL TO PROVIDE PROTECTION. EMPHASIS IS ON DESCRIBING THOSE  
SIX ITEMS WHICH DEVELOPED DIFFERENCES IN MATERIAL BEHAVIOR  
CONSIDERED TO BE SIGNIFICANT IN TERMS OF THE GENERAL  
APPLICATION. THREE INVOLVED ELECTRICAL PERFORMANCE OF THE  
FILM, ALUMINUM IN CONJUNCTION WITH HYBRID CIRCUIT ELEMENTS,  
TWO DEALT WITH MECHANICAL PROPERTIES, AND ONE WITH CHEMICALLY  
RELATED BEHAVIOR. IT IS SUGGESTED THAT THE TESTS COULD BE USED  
FOR PARTICULAR APPLICATIONS WHICH RELATE TO THE TEST  
CONDITIONS OR IN UNDERSTANDING SOME FAILURE MODES WHICH COULD  
BE EXPECTED IN COMPLEX HYBRID MICROCIRCUIT ASSEMBLIES. A BRIEF  
REVIEW IS GIVEN OF THOSE TESTS WHICH WERE NOT CONSIDERED TO  
DEVELOP DISTINCTIONS BETWEEN MATERIALS. THE ROLE OF ORGANIC  
COATINGS ON BARE SEMICONDUCTOR DEVICE SURFACES WAS NOT  
INVESTIGATED (17 Refs.)

D-Subj: POLYMERS  
Identifiers: POLYMERS: CHEMICAL BEHAVIOR: ENCAPSULATION: THERMAL  
PROTECTION: COATINGS

: POLYMER MATERIALS: PROTECTIVE COATINGS: HYBRID MICRO CIRCUITS  
: EVALUATION PROGRAM: MATERIAL BEHAVIOR: ELECTRICAL  
PERFORMANCE: MECHANICAL PROPERTIES: TEST CONDITIONS  
02  
Section Class Codes: B2540, B1266  
Unified Class Codes: SMEAB, SMEAH

743200 87526271, 87511718  
THE STRUCTURE AND PROPERTIES OF THIN METAL FILMS  
HOFFMAN, D.M.  
RCA LABS., PRINCETON, N.J., USA  
PROCEEDINGS OF THE 28TH ANNUAL FREQUENCY CONTROL SYMPOSIUM  
1974 185-8 1974  
29-31 MAY 1974 ATLANTIC CITY, N.J., USA  
ELECTRONIC INDUSTRIES ASSOC., WASHINGTON, D.C., USA  
THE PROPERTIES OF VACUUM EVAPORATED THIN METAL FILMS ARE  
DIRECTLY ATTRIBUTABLE TO THE CONDITIONS OF PREPARATION. AMONG  
THESE PARAMETERS ARE RESIDUAL ATMOSPHERE, RATES OF EVAPORATION  
AND DEPOSITION, PURITY OF SOURCE MATERIAL AND EVAPORANT,  
SUBSTRATE TEMPERATURE AND CLEANLINESS. SOME OF THE REACTIONS FOR  
VAPORISATION OF THE PROPERTIES OF FILMS FROM THOSE OF INULL METALS  
ARE DISCUSSED AS WELL AS WAYS OF MINIMIZING THESE EFFECTS.  
ILLUSTRATIONS, FOCUS ON METALS USED IN CRYSTAL COATING, E.G.  
GOLD, CHROMIUM, AND SILVER (20 Refs.)

Descriptor: METALLIC THIN FILMS: CRYSTAL GROWTH FROM VAPOUR  
: THIN FILM CIRCUITS: ADHESION RATE: DEPOSITION RATE: PURITY OF  
EVAPORANT: VACUUM EVAPORATED THIN METAL FILMS: CONDITIONS OF  
PREPARATION: RESIDUAL ATMOSPHERE: PURITY OF SOURCE MATERIAL;  
SUBSTRATE TEMPERATURE: CLEANLINESS: CRYSTAL COATING:  
06  
Section Class Codes: A9112, AB362, A7880, B2524  
Unified Class Codes: 2GCCAX, RGGCAD, NYVAAK, SMEAH

743199 87511717  
SELECTIVE FLOW COATING OF THIN FILM INTEGRATED CIRCUITS  
WILLIE, J.R.  
TECH. DIG. (USA) NO. 36 33-4 OCT. 1974 Coden: TCHDAV  
DESCRIBES A SELECTIVE COATING TECHNIQUE WHICH PROVIDES  
PROTECTION AGAINST MOISTURE AND MECHANICAL DAMAGE ALLOWING  
POST TRIMMING OF THIN FILM RESISTORS, CAPACITORS OR DISCRETE  
COMPONENTS OF THE CIRCUIT WHEN REQUIRED. ALSO CONTACT PADS  
REMAIN EXPOSED TO PROVIDE CONNECTION POINTS TO OTHER CIRCUITRY  
Descriptor: THIN FILM CIRCUITS: ENCAPSULATION  
Identifiers: THIN FILM CIRCUITS: ENCAPSULATION: SELECTIVE FLOW COATING:  
THIN FILM INTEGRATED CIRCUITS: COATING TECHNIQUE: CONTACT PADS  
02  
Section Class Codes: B2524, B1267, B1266  
Unified Class Codes: SMEAH, ADGKAT, ADGMAH

743200 87526271, 87511718  
THE STRUCTURE AND PROPERTIES OF THIN METAL FILMS  
HOFFMAN, D.M.  
RCA LABS., PRINCETON, N.J., USA  
PROCEEDINGS OF THE 28TH ANNUAL FREQUENCY CONTROL SYMPOSIUM  
1974 185-8 1974  
29-31 MAY 1974 ATLANTIC CITY, N.J., USA  
ELECTRONIC INDUSTRIES ASSOC., WASHINGTON, D.C., USA  
THE PROPERTIES OF VACUUM EVAPORATED THIN METAL FILMS ARE  
DIRECTLY ATTRIBUTABLE TO THE CONDITIONS OF PREPARATION. AMONG  
THESE PARAMETERS ARE RESIDUAL ATMOSPHERE, RATES OF EVAPORATION  
AND DEPOSITION, PURITY OF SOURCE MATERIAL AND EVAPORANT,  
SUBSTRATE TEMPERATURE AND CLEANLINESS. SOME OF THE REACTIONS FOR  
VAPORISATION OF THE PROPERTIES OF FILMS FROM THOSE OF INULL METALS  
ARE DISCUSSED AS WELL AS WAYS OF MINIMIZING THESE EFFECTS.  
ILLUSTRATIONS, FOCUS ON METALS USED IN CRYSTAL COATING, E.G.  
GOLD, CHROMIUM, AND SILVER (20 Refs.)

Descriptor: METALLIC THIN FILMS: CRYSTAL GROWTH FROM VAPOUR  
: THIN FILM CIRCUITS: ADHESION RATE: DEPOSITION RATE: PURITY OF  
EVAPORANT: VACUUM EVAPORATED THIN METAL FILMS: CONDITIONS OF  
PREPARATION: RESIDUAL ATMOSPHERE: PURITY OF SOURCE MATERIAL;  
SUBSTRATE TEMPERATURE: CLEANLINESS: CRYSTAL COATING:  
06  
Section Class Codes: A9112, AB362, A7880, B2524  
Unified Class Codes: 2GCCAX, RGGCAD, NYVAAK, SMEAH

742686 B7511600 HYBRID CIRCUIT TECHNOLOGY: RADIATION OF A FAST INS AMPLIFIER  
VELCR, J.C.  
CLACLING, GRENOBLE, FRANCE  
THIN SOLID FILMS (SWITZERLAND) VOL. 24, NO. 2 251-60  
DEC. 1974 Coden: THS1AP  
A fast rise-time amplifier (1 ns) has been made using hybrid  
microcircuit technology. This is a single polarity pulse  
amplifier with a 20 dB voltage gain. The author used thin film  
technology on ceramic substrates and an electron-beam gun for  
evaporating the tantalum and gold. An investigation of the  
amplifier has indicated that the characteristics of the hybrid  
microcircuit are better than those of the printed circuit  
version. The improvements are a shorter output rise-time and  
an apertodic response (5 refs)  
Identifiers: PULSE AMPLIFIERS; HYBRID INTEGRATED CIRCUITS  
MICROCIRCUIT TECHNOLOGY; SINGLE POLARITY PULSE AMPLIFIER; 20  
DB VOLTAGE GAIN; CERAMIC SUBSTRATES  
02  
Section Class Codes: B1800, B2540  
Unified Class Codes: ETHAB, SNEAB  
Language: FRENCH

739395 B7509632 TANTALUM NITRIDE THIN FILM CIRCUITS FOR CS-36M SUBMARINE  
CABLE REPEATER  
MATSUDOTO, T.; NAYASHI, K.; YAMAMOTO, T.; MORIYA, K.  
ELECTR. COMMUN. LAB. TECH. J. (JAPAN) VOL. 23, NO. 8  
1549-61 1974 Coden: TJECS  
112 Refs)  
Descriptors: SUBMARINE CABLES; REPEATERS; TANTALUM COMPOUNDS  
: THIN FILM CIRCUITS  
Identifiers: TANTALUM NITRIDE THIN FILM CIRCUITS: CS36M  
SUBMARINE CABLE REPEATERS  
02  
Section Class Codes: B3562, B1840, B2524  
Unified Class Codes: PEKEAB, ETHAB, SNEAB  
Language: JAPANESE

733028 B7509625 IDENTIFICATION OF AGCL AS A SURFACE CONTAMINANT ON HYBRID  
MICROCIRCUIT CAPACITORS USING ION MICROPROBE TECHNIQUES  
GUTHRIE, J.W.  
SANDIA LABS., ALBUQUERQUE, N.MEX., USA  
J. ELECTROCHEM. SOC. (USA) VOL. 121 NO. 12 1617-20  
DEC. 1974 Coden: JESDN  
AN ION MICROPROBE MASS ANALYZER (IMMA) WAS USED FOR THE  
IDENTIFICATION ANALYSIS OF A MICRON-SIZED SURFACE CONTAMINANT  
ON HYBRID MICROCIRCUIT BARIUM TITANATE CAPACITORS WITH SILVER  
FRIT TERMINATIONS. A 10.5 KEV O<sub>2</sub> SUB 2/5 SUP + / SPUTTERING ION  
BEAM WAS USED TO OBTAIN CHARACTERISTIC POSITIVE AND NEGATIVE  
SPUTTERED ION SPECIES FOR MASS SPECTRA. SCRANNING ION  
MICROGRAPHS, AND DEPTH PROFILES FROM CLEAN AND CONTAMINATED CAPACITORS  
CONTAINED SIGNIFICANT PEAKS FOR AGCL SUP + /, HCL SUP + /,  
AG/SUB 2/5 SUP + /, AG/SUB 2/0 SUP + /, AND CL SUP - / SPUTTERED  
ION SPECIES. ON THE CLEAN CAPACITORS THESE SPECIES WERE  
DETECTED ONLY AS LOW DENSITY PEAKS OR NOT AT ALL. SILVER  
CHLORIDE WAS IDENTIFIED AS A MAJOR CONTAMINANT BY COMPARING  
AGCL CALIBRATION MASS SPECTRA WITH THE MASS SPECTRA OBTAINED  
FROM THE CLEAN AND THE CONTAMINATED CAPACITORS (1) Refs)  
Identifiers: HYBRID INTEGRATED CIRCUITS; CAPACITORS; AG FRIT  
TERMINATIONS; AGCL; HYDRO MICROCIRCUIT CAPACITORS; 10  
MICROPROBE TECHNIQUES; SPUTTERED ION SPECIES  
02  
Section Class Codes: B2540, B2670  
Unified Class Codes: SNEAB, SMMAR

738013 A7522604, B7509602 FLAT-SURFACE ALUMINIUM-OXIDE CERAMICS  
S. TAKHVISICS, L. MIMROTECH, (HUNGARY) VOL. 13, NO. 9 262-8  
SEPT. 1974 Coden: ENKAV  
SUGGESTS ON THE BASIS OF EXPERIMENTS THAT CHEMICALLY PURE  
RAW MATERIAL, WITH AVERAGE GRAIN SIZE OF MAX. 1 MUM CONTAINING  
AL(II) ADDITIVES, TO PREVENT GRAIN GROWTH, IS NECESSARY TO  
PRODUCE ALUMINIUM-OXIDE CERAMICS WITH A SURFACE ROUGHNESS OF  
BELOW 0.5-0.1 MUM, AFTER MOLDING AT A HIGH RAW DENSITY. THIS  
SHOULD BE SINTERED AT A POSSIBLY LOW TEMPERATURE (AROUND 1600  
DEG FSC). THE FINE CRYSTAL PROFILE ATTAINS ITS FINAL SURFACE  
FINISH AFTER MULTISTEP GRINDING AND POLISHING. CORRELATIONS  
ARE GIVEN ON THE EFFECT OF S10/SUB 2/ COATING AND OF GRAIN  
SIZE ON SURFACE ROUGHNESS. FURTHER SINTERIZING CHARACTERISTICS  
ARE PRESENTED.  
THE EXPERIMENTS ARE CONNECTED PRIMARILY WITH  
THE PRODUCTION TECHNOLOGY OF THICK AND THIN FILM INTEGRATED  
CIRCUIT SUBSTRATES (29 Refs)  
Identifiers: CERAMICS; ALUMINIUM COMPOUNDS; INTEGRATED  
CIRCUIT PRODUCTION; SUBSTRATES; THIN FILM CIRCUITS; THICK FILM  
CIRCUITS  
02  
Identifiers: FLAT SURFACE; AL/SUB 2/0/SUB 3/ CERAMICS; THICK  
FILM CIRCUIT SUBSTRATES; INTEGRATED CIRCUIT PRODUCTION; GRAIN  
GROWTH; SURFACE ROUGHNESS; SURFACE FINISH; EFFECT OF S10/SUB  
2/; GRAIN SIZE; SINTERIZING CHARACTERISTICS; THIN FILM  
INTEGRATED CIRCUIT SUBSTRATES

733011 B7508603  
 EFFECT OF GRAIN SIZE ON THE LIFE TIME OF ALUMINUM  
 INTERCONNECTIONS  
 SAITO, M.; MIROTA, S.  
 REV. ELECTR. COMMUN. LAB. (JAPAN) VOL. 22 NO. 7-8 678-94  
 JULY-AUG. 1974  
 Coden: RELTAH  
 In order to suppress transport strain and plastic deformation, aluminum evaporation conditions making uniform film with large grain size were investigated. aluminum stripe film's in four grain size categories were made and high temperature-high current tests were performed. it was found that the average grain size had a large effect on mean time to failure. activation energy and current density index. the relation of  $mtf = D \cdot \exp(-N/(N_0))$  at stripe width  $w=7.20\mu$  and  $mtf$  increased linearly with  $w$  ( $10 \text{ Bo}^{1/3}$ )  
 Discriptrors: thin film circuits; crystal growth from vapour; circuit reliability; grain size; integrated circuit production; integrated circuit testing; aluminum; uniform film; grain size; mean time to failure; activation energy; current density index  
 02  
 Section Class Codes: B2526, B2524  
 Unfiled Class Codes: SMCGAT, SMCEAH

733010 B7509601  
 AIR-ABRASIVE FUNCTIONAL TRIMMING OF THICK FILM CIRCUITS  
 GOULD, L.F.; WEST, R.J.; WOOD, M.J.  
 WISTONHOUSE BRAKE SIGNAL CO. LTD, CHIPENHAM, ENGLAND  
 ELECTRONICOM, SCI. AND TECHNOL. (GB) VOL. 1, NO. 1 75-8  
 SEPT. 1974  
 An air abrasive trimmer has been modified to allow it to be used for functional trimming. this involves the use of a new gig to hold the circuit and to make electrical contact with its terminals. the automatic resistance bridge on the rig is replaced with a pulse measuring circuit which stops the trimming cycle when the correct output is obtained. Discriptrors: thick film circuits; integrated circuit production; air abrasive functional trimming; integrated circuit production; thick film circuits; pulse measuring circuit  
 02  
 Section Class Codes: B2522  
 Unfiled Class Codes: SMCCAX

FOR THE A.F. RANGE, FILTERS INCREASINGLY REPRESENT A TECHNICAL AND OFTEN ALSO ECONOMICAL ALTERNATIVE TO LC-FILTERS.  
 FAVORING THEIR APPLICATION ARE THE DEGREE OF MINIATURIZATION ACHIEVABLE IN THIS FREQUENCY RANGE, AND THE RELIABILITY, ACCURACY, LASTING STABILITY AND TEMPERATURE CONSTANCY MADE POSSIBLE THROUGH THE TANTALUM-FILM TECHNOLOGY. THE DIMENSIONAL REQUIREMENTS AND THE TECHNICAL REALIZATION OF AC-FILTERS IN TANTALUM THIN-FILM TECHNIQUE ARE DESCRIBED (5 Refs)  
 Descriptrors: active filters; hybrid integrated circuits; thin film circuits  
 Identifiers: active rc filters; tantalum hybrid ic; audio frequency; miniaturization; reliability; accuracy; stability; temperature constancy; dimensional requirements  
 02  
 Section Class Codes: B1890, B2540, B2524  
 Unfiled Class Codes: ETRAAM, SMEAB, SMCEAH

726721 B7505378, C7504659  
 ANODIZATION CONTROLLER  
 HASARIS, S. V.; JIRAF, M. J.  
 INDIAN INST. OF TECHNOL., BOMBAY  
 J. INST. ELECTRON. AND TELECOMMUN. ENG. (INDIA) 10-13  
 JAN.-FEB. 1974  
 Coden: JIETAU  
 AN ELECTRON. INSTRUMENT TO CONTROL ANODIZATION OF TANTALUM THIN FILM USED IN THE FABRICATION OF RESISTORS AND CAPACITORS FOR HYBRID MICRO CIRCUITS HAS BEEN DEVELOPED. IN THE CASE OF RESISTORS, TANTALUM PENTOXIDE LAYER WHICH IS GROWN ON THE SURFACE DURING ANODIZATION REDUCES THE RESISTORS TRACK THICKNESS THEREBY INCREASING ITS RESISTANCE. DURING ANODIZATION THE RESISTANCE IS SENSED CONTINUOUSLY USING A WHEATSTONE BRIDGE EXCITED FROM AN A.C. VOLTAGE SOURCE. THE FOUR ARMS OF THE BRIDGE CONSIST OF TWO EQUAL RESISTORS, THE TANTALUM RESISTOR BEING ANODIZED AND A REFERENCE RESISTOR BEFORE. WHEN THE TANTALUM RESISTOR BECOMES EQUAL TO THE REFERENCE RESISTOR THE OUTPUT OF THE BRIDGE AT THIS MOMENT IS USED TO GET A STEP OUTPUT WHICH IN TURN IS USED TO STOP THE ANODIZATION PROCESS (7 Refs)  
 Descriptrors: controllers; thin film resistors; thin film capacitors; hybrid integrated circuits; integrated circuit production; thin film circuits  
 Identifiers: thin film resistors; thin film capacitors; anodization controller; tantalum thin film; fabrication; hybrid microcircuits  
 02  
 Section Class Codes: C7695, C7610, B2540, B2210, B2670.  
 B2524  
 Unfiled Class Codes: VMZMAB, VKCAAQ, SMEAB, SEEAS, SMMAAR.

732650 B7508213  
 ACTIVE RC-FILTERS IN TANTALUM THIN-FILM HYBRID TECHNIQUE  
 BOSELMANN, W.  
 SIEBERS AG, MUNCHEN, GERMANY  
 C-7074-15, AEP, (GERMANY) VOL. 9 NO. 3 77-80 JULY 1974  
 Coden: C-7074-15, AEP, (GERMANY)

72145 B7505380 THICK FILM TECHNIQUES FOR HYBRID INTEGRATED MICROWAVE CIRCUITS  
EUKI, W. I. SCHILLZ, W. PHILLIPS FORSCHUNGSLAB. HAMBURG GMBH, GERMANY  
RADIO AND ELECTRON. ENG. (GB) VOL. 44 NO. 9 504-8 SEPT.  
1971 Coden: ADEEA4  
Ref.: 1  
The applicability of thick film technique has been investigated for frequencies above 1 GHz. By using a special technique (indirect initial foil screens) integrated microwave circuits for frequencies up to 10 GHz have been fabricated. The special requirements for microwave thick film circuits are discussed and the electrical and technological properties of three selected microwave circuits are reported in detail.  
Dir.ctors: HYBRID INTEGRATED CIRCUITS: SOLID-STATE  
Identifiers: THICK FILM TECHNIQUES: HYBRID INTEGRATED MICROWAVE CIRCUITS  
02  
Section Class Codes: B2540  
Unified Class Codes: SMEAAB  
Language: GERMAN

AEG-TELEFUNKEN, ULM, GERMANY  
SOLID STATE TECHNOLOGY (USA) VOL. 17 NO. 10 69-72 OCT.  
1974 Coden: SSTEAP  
A D.C. DIODE SPUTTER ETCH PROCESS IS DESCRIBED YIELDING A SPUTTER ETCH RATE OF THE INSULATING MASKING LAYER WHICH IS CONSIDERABLY SMALLER THAN THAT OF THE CONDUCTING MATERIAL. WITH THIS TECHNIQUE, WALL ANGLES OF ABOUT 60 DEGREES ARE ACHIEVED WITH NO UNDERCUTTING. (2 Refs)  
Descrip.tors: SPUTTERING; INTEGRATED CIRCUIT PRODUCTION;  
ETCHING; THIN FILM CIRCUITS  
Identifiers: ALUMINA SUBSTRATE; POTENTIAL DISTRIBUTION;  
STENCIL MASK; FABRICATION; PHOTORESIST MASK; SECONDARY ELECTRONS; THIN FILM STRUCTURES; GAP WIDTH; DC DIODE SPUTTER ETCH PROCESS; SPUTTER ETCH RATE; WALL ANGLES  
02  
Section Class Codes: B2524, B1267  
Unified Class Codes: SMEAAB, ADGKAT

72143 B7505377 MONOLITHIC AND HYBRID INTEGRATED CIRCUITS  
GALLI, H. ELTRONIKER (SWITZERLAND) VOL. 13. NO. 10 EL6-10 OCT.  
1971 Coden: ELKRL  
Ref.: 1  
Discusses the criteria for the choice of hybrid, rather than monolithic integrated circuits. Introduces the basic technology of thick-film circuits, describing the basic elements, the addition of discrete semiconductors, and methods of encapsulation. Presents numerous photographs as well as a table quoting the main physical characteristics of substrates, data of three different pastes for resistor deposition and a list of SOI 23 housed transistors and diodes, with collector dissipation of approx. 200 mW at 25 degrees C.  
Dir.ctors: HYBRID INTEGRATED CIRCUITS: INTEGRATED CIRCUIT PRODUCTION; MONOLITHIC INTEGRATED CIRCUITS  
Identifiers: THICK FILM CIRCUITS; INTEGRATED CIRCUIT PRODUCTION; HYBRID INTEGRATED CIRCUITS; MONOLITHIC INTEGRATED CIRCUITS; DISCRETE SEMICONDUCTORS; ENCAPSULATION; SUBSTRATES; PASTES FOR RESISTOR DEPOSITION; HOUSED TRANSISTORS AND DIODES  
02  
Section Class Codes: B2540, B2528  
Unified Class Codes: SMEAAB, SMEKAK  
Language: GERMAN

72137 B7505351 SCREEN, ESSENTIAL TOOL FOR THICK FILM PRINTING  
FRANCKVILLE, F.; KURMELL, M.; STAUNECKER, S. G.  
COMPAGNIE MOHEWELL BULL, SAINT-DENIS, FRANCE  
SOLID STATE TECHNOLOGY (USA) VOL. 17 NO. 10 61-8 OCT. 1974  
Coden: SSTEAP  
Many variables in thick-film printing have been studied and described in the literature. They refer generally to paste behavior and printing conditions. Different screen types are reviewed, and comparison of the metal mask versus the emulsion screen for different applications are presented. The main characteristics and advantages of direct-emulsion type screens are discussed in terms of screen quality, control for repeatable printing, with special attention to screen tension evolution during its lifetime and to selection of the proper solvent for screen cleaning. The influence of various screen parameters will be documented by typical printed examples and methods of control of these parameters in production will be described. (8 Refs)  
Descrip.tors: THICK FILM CIRCUITS; INTEGRATED CIRCUIT PRODUCTION; TOOLS; PRINTING  
Identifiers: DIRECT EMULSION TYPE SCREEN; TENSION; EMULSION THICKNESS MEASUREMENT; STAINLESS STEEL MESH; ALUMINUM FRAMES; EPOXY ADHESIVE; THICK FILM PRINTING; PRINTING CONDITIONS; METAL MASK; EMULSION SCREEN; QUALITY CONTROL; SCREEN TENSION; SOLVENT; SCREEN CLEANING  
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Section Class Codes: B2522, B1269  
Unified Class Codes: SMECAX, ADGMAE

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721396 B7505350 SCREENABILITY AND RHEOLOGY  
MILLER, L.F.  
LUM. HOPEWELL JUNCTION, N.Y. USA  
SOLID STATE TECHNOL. (USA) VOL.17 NO.10 54-60 OCT.  
1974 *Coden: STEAP*  
A BRIEF SUMMARY OF SOME OF THE CHARACTERISTICS OF POLYMER  
SOLUTIONS WHICH AFFECT RHEOLOGY IS PRESENTED. THE RATES OF  
SHEAR OBSERVED IN ACTUAL SCREENING PROCESSES, AND THE MORE  
SUBTLE IMPLICATIONS OF VISCOELASTICITY ARE EXAMINED. THIS  
ARTICLE PROVIDES A BACKGROUND ON THE RHEOLOGY OF POLYMER  
SOLUTIONS. TO SHOW HOW RHEOLOGY CAN BE MODIFIED AND  
CONTROLLED, AND TO PROVIDE SOME EXAMPLES RELATING TO THESE  
CONSIDERATIONS IN THICK FILM PASTES (13 Refs)  
Descriptors: RHEOLOGY; THICK FILM CIRCUITS; INTEGRATED  
CIRCUIT PRODUCTION; VISCOELASTICITY; PRINTING.  
Identifiers: ELASTIC RESPONSE; RATE OF STRESS; TEMPERATURE;  
GEL STRUCTURES; VISCOUS FLOW; THIXOTROPIC TIME CONSTANT;  
SCREENABILITY; RHEOLOGY; POLYMER SOLUTIONS; SCREENING  
02  
Section Class Codes: B2522  
Unified Class Codes: SMCAK, DDEMAG, NCMGAH

721397 B7505349 A NEW CLASS OF HIGH PERFORMANCE BROADBAND 3 DB DIRECTIONAL  
COUPLERS IN THIN FILM TECHNIQUE  
SCHIEK, B.; KOHLER, J.  
PHILLIPS FORSCHUNGSLABORATORIUM HAMBURG GMBH, GERMANY  
4TH EUROPEAN MICROWAVE CONFERENCE, SIG-40, 1974  
10-13 SEPT. 1974 MONTREAL, SWITZERLAND  
MICROWAVE EXHIBITIONS AND PUBLISHERS SURVEY, ENGLAND  
The authors show that planar broadband 3 db directional  
couplers can be constructed in microstrip-slot and thin film  
technique. Etching both sides of a ceramic substrate, no  
overlapping or bonding wires are needed and the dimensions of  
the layout are given by no means critical. An accurate,  
straightforward and closed form theory allows 3 db couplers to  
be constructed whose measured performance is within a few  
tenths of 1 db of the predicted value. The measured insertion  
loss of these couplers, including the connector losses, is as  
low as 0.3 db in C-band and 0.6 db in X-band. The 10-0.5 db  
bandwidth is approximately one octave and the isolation of the  
coupler is better than 30 db over this band (6 Refs)  
Descriptors: DIRECTIONAL COUPLERS; THIN FILM CIRCUITS; STRIP  
LINE COMPONENTS  
Identifiers: THIN FILM TECHNIQUE; CERAMIC SUBSTRATE; CLOSED  
FORM THEORY; INSERTION LOSS; CONNECTOR LOSSES; C-BAND; X-BAND;  
ISOLATION; MICROSTRIP-SLOT TECHNIQUE; WIDEBAND 3 DB  
06  
Section Class Codes: B3200, B2524  
Unified Class Codes: ENMWA, SMCEAH

721398 B7505349 THICK FILM TECHNOLOGY  
RIVERA, J.  
REV. ESP. ELECTRON. (SPAIN) VOL.21 NO.238 42-5 SEPT.  
1974 *Coden: RVE01*  
A HYBRID THICK FILM CIRCUIT IS PRODUCED BY PRINTING OR  
DEPOSITING A SERIES OF CONDUCTING, INSULATING OR  
DIELECTRIC COMPOUNDS AND THE PROCEDURE IS DESCRIBED. THE  
CONCEPT AND SPECIFICATIONS OF RESISTIVE FILMS ARE DISCUSSED  
AND COMPARED WITH THE SPECIFICATIONS OF THE SUBSTRATE AND  
PRE-PRINTED CONDUCTING FILMS. THE THICKNESS OF THE FILMS  
DEPOSITED IS MEASURED AND CONTROLLED BY A COMPARATOR OR A  
STILL-FILM PROFILOGRAPH. ON A MICROSCOPE WITH AN OPTICAL  
INTERFLECTION DETECTOR, THE CHARACTERISTICS AND POTENTIAL  
APPLICATIONS OF THICK FILM CIRCUITS ARE ALSO CONSIDERED  
Descriptors: HYBRID CIRCUITS; CIRCUIT PRINTING; FILM  
THICKNESS MEASUREMENT; THICK FILM TECHNOLOGY; DIELECTRIC  
COMPOUNDS; SPECIFICATIONS; RESISTIVE FILMS; SUBSTRATE;  
02  
Section Class Codes: B2522, B2210, B4441  
Unified Class Codes: SMCAK, SEEAS, BKECA  
Language: SPANISH

714027 B7502927 ADVANCES IN LOW TEMPERATURE DIE BONDING TECHNIQUES  
BULL, D.M. FT. LAUDERDALE, FLA., USA  
MOTOROLA INC., SOLID STATE TECHNOL. (USA) VOL.17, NO.9 60-5 SEPT.  
1974 Coden: SSIEAP  
WHEN HYBRID MICROCIRCUITS WERE FIRST PRODUCED, THE ACTIVE DEVICES WERE EITHER ENCAPSULATED IN STANDARD PACKAGES OR EUTECTICALLY DIE BONDED TO GOLD PLATED TABS. DURING ASSEMBLY, THE SE PACKAGES OR TABS WERE ATTACHED TO THE FILM CIRCUIT WITH A LOW TEMPERATURE SOLDER. SENSITIVITY OF THE FILM RESISTORS TO THE HIGH TEMPERATURE ASSOCIATED WITH EUTECTIC DIE BONDING REQUIRED THIS PREPACKAGED APPROACH. SINCE THEN, CIRCUIT DENSITY HAS INCREASED AND THE REQUIREMENT OF MANY ACTIVE DEVICES FURTHER COMPLICATES THE PROCESS WITH DIE PARAMETER SHIFTS AND BOND PAD LEACHING (FLOATING) EFFECTS. THIS ARTICLE DISCUSSES SEVERAL TECHNIQUES DEVELOPED TO ATTACH THE DIE DIRECTLY TO THE MODULE WHICH AVOIDS OR REDUCES THESE EFFECTS. ALSO, MONOLITHIC DEVICE ASSEMBLY CAN USE THESE TECHNIQUES TO ADVANTAGE. (7 Refs)  
Profilers: INTEGRATED CIRCUIT PRODUCTION: JOINING  
Identifiers: LOW TEMPERATURE DIE BONDING TECHNIQUES; HYBRID MICROCIRCUITS; FILM CIRCUITS; EUTECTIC DIE BONDING; MONOLITHIC DEVICE ASSEMBLY; EPoxy DIE BONDING  
02  
Section Class Codes: B2560  
Unified Class Codes: SANGAR

714028 B7502928 A HIGH DENSITY THICK FILM MULTILAYER PROCESS FOR LSI CIRCUITS  
TIGHE, R.W.; MOGEY, L.E.; WALTER, D.W.  
RAYTHEON CO., BEDFORD, MASS., USA  
TELE. TRANS. PARTS, HYBRIDS AND PACKAG. (USA) VOL. PHP-10 NO.3 165-9 SEPT. 1974 Coden: IEPHAA  
SCE ACSR. B3411B OF 1974 (3 Refs)  
Identifiers: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS; LARGE SCALE INTEGRATION; INTEGRATED CIRCUIT PRODUCTION PROCESS; LSI CIRCUITS  
02  
Section Class Codes: B2540, B2522  
Unified Class Codes: SMEAB, SMCCAX

714029 B7502929 A HIGH DENSITY THICK FILM MULTILAYER PROCESS FOR LSI CIRCUITS  
TIGHE, R.W.; MOGEY, L.E.; WALTER, D.W.  
RAYTHEON CO., BEDFORD, MASS., USA  
TELE. TRANS. PARTS, HYBRIDS AND PACKAG. (USA) VOL. PHP-10 NO.3 165-9 SEPT. 1974 Coden: IEPHAA  
SCE ACSR. B3411B OF 1974 (3 Refs)  
Identifiers: HYBRID INTEGRATED CIRCUITS; THICK FILM CIRCUITS; LARGE SCALE INTEGRATION; INTEGRATED CIRCUIT PRODUCTION PROCESS; LSI CIRCUITS  
02  
Section Class Codes: B2540, B2522  
Unified Class Codes: SMEAB, SMCCAX

714030 B7502930 REAL TIME DETECTION OF MICROCRACKS IN BRITTLE MATERIALS  
USI, STRESS WAVE EMISSION (SMW)  
VAMVILIOS, S.J.  
WESTERN ELECTRIC CO., PRINCETON, N.J., USA  
TELE. TRANS. PARTS, HYBRIDS AND PACKAG. (USA) VOL. PHP-10 NO.3 165-9 SEPT. 1974 Coden: IEPHAA  
SCE ACSR. B3411B OF 1974 (3 Refs)  
Identifiers: MICROCRACKS; BRITTLE MATERIALS; STRESS WAVE EMISSION  
02  
Section Class Codes: B2524, B1268  
Unified Class Codes: SMEAH, ZGIAAA

SEE ABST. B34086 OF 1970 (19 Refs)  
Descriptions: TWIN FILM CIRCUITS; INTEGRATED CIRCUIT TESTING: MATERIALS TESTING; CRACK DETECTION  
Identifiers: THIN FILM IC TESTING; REAL TIME DETECTION OF MICROCRACKS; BRITTLE MATERIALS; STRESS WAVE EMISSION  
02  
Section Class Codes: B2524, B1268  
Unified Class Codes: SMEAH, ZGIAAA

714031 B7502931 MOLECULAR BONDING CONDUCTIVE FILMS  
SAYERS, P.  
ENGEHARD MINERALS AND CHEM. CORP., EAST NEWARK, N.J., USA  
SOLID STATE TECHNOL. (USA) VOL.17, NO.9 66-9 SEPT.  
1974 Coden: SSIEAP  
A REACTIVE BOND MECHANISM, REINED 'MOLECULAR BONDING', HAS BEEN DEVELOPED AND INCORPORATED IN CONDUCTIVE SYSTEMS, BASED ON GOLD, SILVER, ALUMINUM OR NICKEL. THE REACTIVE BOND MECHANISM IS UNIQUE IN THAT THE INTERFACIAL ENERGY ASSOCIATED WITH THE CONDUCTOR-REACTION PRODUCT INTERFACE IS GREATER THAN THE SURFACE TENSION OF MOLTEN ALUMINUM, SILVER AND THESE CONDUCTORS MAY BE FIRED AT TEMPERATURES WHICH EXCEED THEIR MELTING POINTS. SIGNIFICANTLY, THE LEACH RESISTANCE AND ADHESION WERE GREATLY IMPROVED FOR SILVER AND GOLD CONDUCTORS AND TECHNIQUES WERE DISCOVERED WHICH PERMIT STANDARD AIR ATMOSPHERIC FIRING OF THE BASE METALS ALUMINUM AND NICKEL. THE HISTORY OF DEVELOPMENT, THE REASONS FOR THE DEVELOPMENT AND THE POTENTIAL ADVANTAGES OF THESE MATERIALS TO THICK FILM USERS ARE PRESENTED. THE APPLICATIONS FOR THESE MATERIALS AND THEIR FUTURE POTENTIAL IS EXPLORED. (5 Refs)  
Identifiers: THICK FILM CIRCUITS; CONDUCTORS (ELECTRIC); SYSTEMS: REACTIVE BOND MECHANISM; LEACH RESISTANCE; CONDUCTIVE THICK FILM CONDUCTORS  
02  
Section Class Codes: B2522, B2205  
Unified Class Codes: SMCCAX, SECAC

714903 87502804  
DIP-TINNING EQUIPMENT FOR THICK-FILM INTEGRATED CIRCUITS  
FABENYI, E.; SULYOK, P.  
FLINNMECH. AND MINROTECH. (HUNGARY) VOL.13, NO.8 230-2  
AUG. 1974 Coden: FNAYK  
DESCRIBES EQUIPMENT BUILT FOR TINNING THICK FILM CIRCUIT PLATES OF 1/25ECCDS. \*1/25ECCDS AND 1SECONDS \*1SECONDS DIMENSIONS. IT CAN WORK IN INTERMITTENT OR CONTINUOUS OPERATION. THE OUTPUT IN CONTINUOUS OPERATION IS 100 PLATES/HOUR. DIP-TINNING IS CARRIED OUT BY MEANS OF A ROTATING DISC. TEMPERATURE OF THE BATH CAN BE ADJUSTED (3 Refs)  
Description: THICK FILM CIRCUITS: INTEGRATED CIRCUIT PRODUCTION  
Identifiers: INTEGRATED CIRCUIT PRODUCTION: DIP TINNING EQUIPMENT: THICK FILM INTEGRATED CIRCUITS  
02 Section Class Codes: B2522, B1269  
Unified Class Codes: SMCAAX, ADGMAE  
Language: HUNGARIAN

714950 87502471  
A WIDE-BAND FEEDFORWARD AMPLIFIER  
MEYER, R.G.; ESCHENDACH, R.; EDDERLEY, W.M., JR.  
U.I.V., CALIFORNIA, BERKELEY, USA  
LINE, J. SOLID-STATE CIRCUITS (USA) VOL.5C-9, NO.6 422-B  
DEC. 1971 Coden: 1J5CUC  
The design of a wide-band feedforward amplifier in the frequency range 30-300 MHz is described. Expressions are derived for feedforward amplifier sensitivity, and the effect of imperfect loop cancellation is described. The effect of circuit imbalance on gain and terminal impedances is investigated. The circuit is realized in thin-film hybrid form, and measurements show 20 dB of distortion improvement at 300 MHz. Practical aspects of circuit adjustment and operation are considered (7 Refs)  
Description: THIN FILM CIRCUITS: HYBRID INTEGRATED CIRCUITS: AMPLIFIERS: SENSITIVITY ANALYSIS  
Identifiers: THIN FILM CIRCUITS: HYBRID FEEDFORWARD AMPLIFIER: IMPERFECT LOOP CANCELLATION: WIDEBAND FEEDFORWARD AMPLIFIER: THIN FILM HYBRID  
02 Section Class Codes: B1840, B2524, B2540  
Unified Class Codes: SMCEAH, SMCAAB

714507 87502411  
HARMONICALLY PUMPED STRIPLINE DOWNCONVERTER  
SCHNEIDER, M.V.; SHELL, W.W., JR.  
BELL LABS., MOLINE, ILL., USA  
4TH EUROPEAN MICROWAVE CONFERENCE 599-603 1974  
MICROWAVE EXHIBITIONS AND PUBLISHERS SURBITON, SURREY, ENGLAND  
A novel thin film downconverter pumped at a submultiple of the local oscillator frequency has given a conversion loss comparable to the performance of conventional balanced mixers. The converter consists of two stripline filters and two Schottky barrier diodes which are shunt mounted in a stripline transmission line. The conversion loss measured at a signal frequency of 3.5 GHz is 3.2 dB for a pump frequency of 1.7 GHz and 4.9 dB for a pump frequency of 0.95 GHz. The circuit looks attractive for use at millimeter-wave frequencies where stable pump sources with low fm noise are not readily available (6 Refs)  
Description: FREQUENCY CONVERTORS; PARAMETRIC DEVICES: SUPERHETERODYNE RECEIVERS; MICROWAVE FILTERS; SCHOTTKY-BARRIER DIODES; STRIPLINE COMPONENTS; HYBRID INTEGRATED CIRCUITS: THIN FILM CIRCUITS  
Identifiers: THIN FILM DOWNCONVERTER; CONVERSION LOSS: STRIPLINE FILTERS; SCHOTTKY BARRIER DIODES; LOW FM NOISE:  
06 Section Class Codes: B1810, B2524, B3290, B1890, B2540  
Unified Class Codes: EIGAAH, SMCEAH, SMCAAB

714513 87502418  
A LUMP-ELEMENT APPROACH TO MICROWAVE INTEGRATED CIRCUITS  
KATOH, H.  
NIPPON ELECTRIC CO. LTD., KAWASAKI  
ELECTRON. AND COMMUN. JAP. (USA) VOL.56 NO.6 47-53  
JUNE 1973 Coden: ECGJAL  
THE FREQUENCY CHARACTERISTICS OF A SPIRAL INDUCTOR AND A THIN-FILM CAPACITOR AND THEIR Q-VALUES ARE DESCRIBED. BASED ON

704511 B7501352  
THE ADVANTAGES OF THIN FILM HYBRIDS IN INSTRUMENTS  
JONES, R. D.  
HEALETT PACKARD, SOUTH QUEENSFERRY, SCOTLAND  
ELECTRICAL COMPONENTS (GB) VOL. 16, NO. 14 29-33 13 AUG.  
1974

Column: ELC/CA3  
Because of the close electrical coupling of individual elements in monolithic integrated circuits, the immediate translation of a given circuit into a monolithic IC is not possible, particularly with high frequency analogue circuitry. However, circuits of this type are readily fabricated as hybrid ICs. Processing techniques and electrical and economic advantages in utilizing hybrid technology are discussed.

Identifiers: HF CIRCUITS; THIN FILM CIRCUITS; ELECTRICAL ADVANTAGES; ECONOMIC ADVANTAGES; PROCESSING TECHNIQUES; INSTRUMENTS; ANALOGUE CIRCUITS; HYBRID ICs; HYBRID TECHNOLOGY

02 Section Class Codes: B42C0, B2524, B2540  
Unified Class Codes: BECA00, SMEAAH, SMEAAB

ACTIVE FILTER BUILDING BLOCK CAPABLE OF REALIZING A VARIETY OF SINGLE AMPLIFIER BIQUADRATIC TOPOLOGIES AND A WIDE RANGE OF TRANSFER FUNCTIONS. THE CIRCUITS MOST COMMONLY USED ARE DESCRIBED. THE DOMINANT PHYSICAL DESIGN FEATURES AND THEIR IMPACT ON THE MANUFACTURE AND USE OF STAR ARE DISCUSSED. [8 Refs.]

Identifiers: ACTIVE FILTERS; HYBRID INTEGRATED CIRCUITS; THIN FILM CIRCUITS; RESONATORS; INTEGRATED CIRCUIT PRODUCTION IDENTIFIERS: THIN FILM HYBRID IC; ACTIVE BIQUADRATIC FILTER SECTION; SINGLE AMPLIFIER BIQUADRATIC TOPOLOGIES; MANUFACTURE; STANDARD FUNCTIONS; PHYSICAL DESIGN FEATURES; MANUFACTURE; STANDARD TANTALUM ACTIVE RESONATOR

06 Section Class Codes: B1800, B2540, B2524  
Unified Class Codes: ETRAAM, SMEAAH

704169 B7500671  
METALLIZING MULTILAYER CERAMIC TOP AND BOTTOM SIDE  
HADAD, M.C.  
IEEE TECH. DISCLOSURE BULL. (USA) VOL. 16, NO. 11 3612  
APRIL 1974 Column: IWTAA

Various metals can be plated upon fired glass fritted noble metal paste conductors which provide the substrate with the proper metallurgy for performing the functional requirements of sites for semiconductor chip joining, pin brazing, and so forth. The metallurgy can then withstand corrosion in most hostile environments.

Identifiers: METALLIZING; MULTILAYER CERAMIC; FIRED GLASS FRITTED NOBLE METAL PASTE CONDUCTORS; SEMICONDUCTOR CHIP JOINING; PIN BRAZING

02 Section Class Codes: B2522, B2540  
Unified Class Codes: SMEAAK, SMEAAB

704190 B7500415  
STAR, AN ACTIVE BIQUADRATIC FILTER SECTION  
FRIEND, J.J.; HARRIS, C.A.; HILBERMAN, D.  
Bell Telephone ABS. INC., Holmdel, N.J., USA  
IEEE  
PROCEEDINGS OF THE 1974 IEEE INTERNATIONAL SYMPOSIUM ON  
CIRCUITS AND SYSTEMS 640-1 1974  
22-25 APRIL 1974 SAN FRANCISCO, CALIF., USA  
IEEE, NEW YORK, USA  
STAR (STAND, R.J. TANTALUM ACTIVE RESONATOR) IS A THIN FILM

